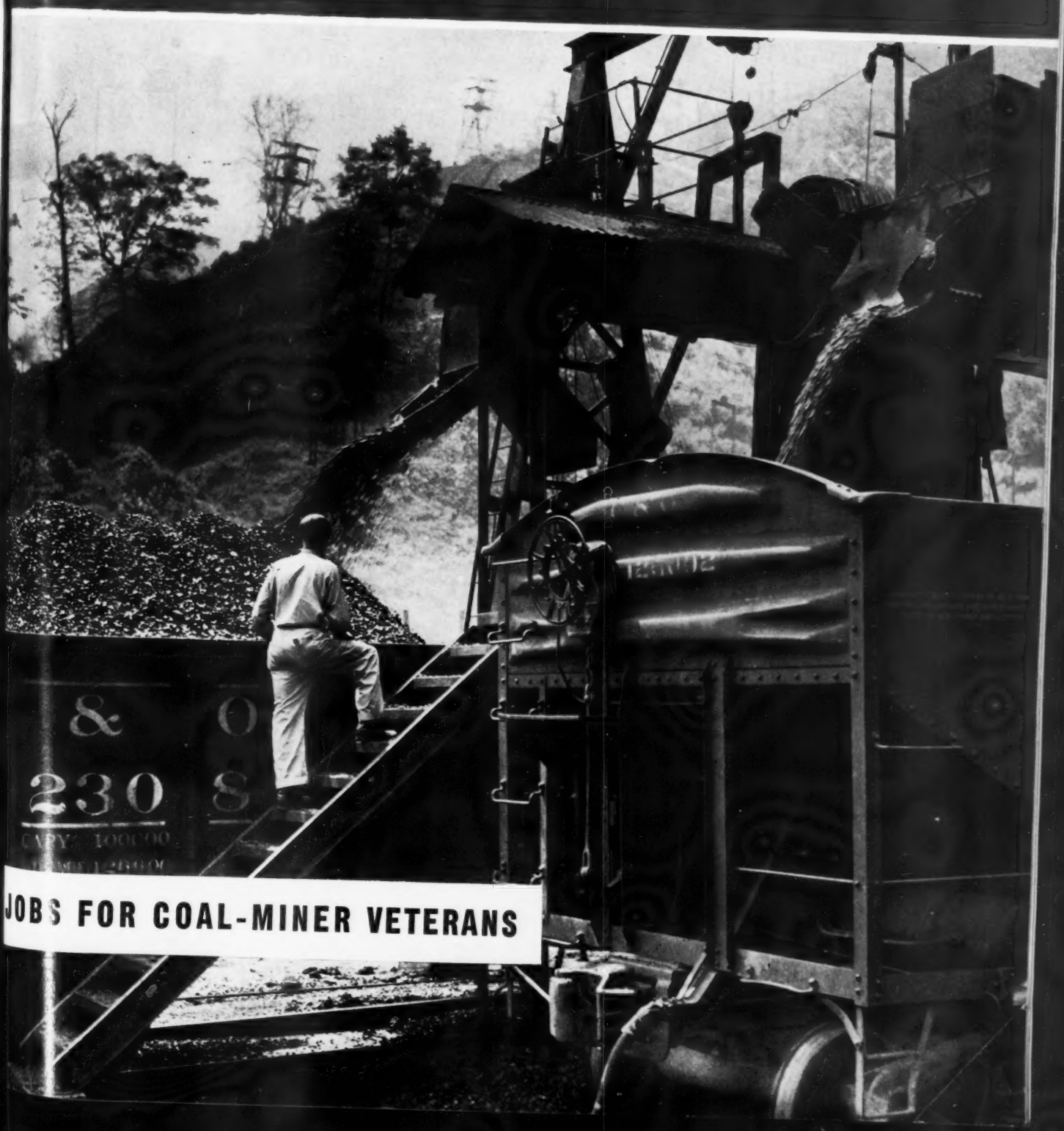
Coal Age

OCTOBER, 1944



JOBS FOR COAL-MINER VETERANS

"Cut Back" IN LUBRICATION COSTS

SUN MINE LUBRICANTS

Save 30% . . . Reduce Equipment Failures

Coal mine equipment operates under conditions that are entirely different from those under which most other types of industrial machinery is used. Dust, dirt, water, low temperatures and overloads are but a few of the conditions which call for specialized lubricants. Sun Mine Lubricants embrace a complete line of oils and greases designed for every type of coal mine equipment. Standardization on this complete line has led to reduced costs and better maintenance of equipment in many mines.

In one instance, a large mine had always divided lubricant purchases among several producers. Lubrication costs and equipment failure were both high.

A series of competitive tests led this company to standardize on Sun Mine Lubricants for every piece of equipment in the mine. In power equipment, breaker machinery, cars, locomotives, conveyors, cutters, loaders, compressors, etc., the special Sun Lubricant recommended by a Sun Engineer for each job, was used.

Lubrication costs dropped 30% throughout the mine. Equipment failure was greatly reduced and during the years since the change, there has been no failure traceable to faulty lubrication.

Undivided responsibility for keeping this mine properly and adequately lubricated has proved a cure for many production delays and for high maintenance costs.

A Sun Lubrication Engineer, with long experience in coal mine lubrication, will be glad to study your problems . . . on one piece of equipment or on every piece. A letter or a phone call will bring him. Also ask us to send you a free copy of the useful manual, "How To Get The Most Out Of Lubricants." Write to

SUN OIL COMPANY • Philadelphia 3, Pa.
Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

SUNOCO

SUN INDUSTRIAL PRODUCTS

HELPING INDUSTRY HELP AMERICA

Under-water mud slinger

A typical example of B. F. Goodrich development in rubber

THAT'S a "cutter head". It will soon be at the bottom of a river; its round blades will turn, and chew up mud. Hose will suck the mud up through a pipe, and so keep rivers and harbors deep enough for shipping. But the shaft that turns this 2-ton mass of metal is under water and so the bearing can't be lubricated by anything but the muddy water churned up by the dredge. This gritty mud gets between shaft and bearing, and cuts up even the hardest metal in a few hours.

B. F. Goodrich engineers heard of this mud dredge problem. They had developed a rubber bearing for propeller shafts of ships. Rubber is slippery when wet, and the bearing is perfectly lubricated by water. The rubber is about as soft as a tire tread and resists wear from small grit particles just as a tire does. They tried it in dredges and it lasted ten times as long as former bearings in the severest kind of service.

B. F. Goodrich Cutless rubber bearings are being used today not only on dredges and river boats but on warships, from the biggest battleships down to small craft of all kinds. In landing boats they have made it possible to go on operating even when propellers and shafts have been bent or damaged. So they're making our navy more efficient, saving cost and repair time, and they'll make similar savings for all ship operators after the war.

Savings in cost and better performance of products are typical results for industry from scores of B. F. Goodrich developments. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F. Goodrich

RUBBER *and* SYNTHETIC *products*

HE DID ONE THING

..supremely well

THE basic principle of the telescope, first made practical by the Italian astronomer, Galileo Galilei, in 1609 A.D., enables man to triumph over distance, whether he studies the stars, or scans sea and sky for enemy action.

THE basic Quality that Hulburt research and experience have put into Hulburt Grease during the past twenty-five years has enabled coal mine operators to triumph over trouble in the lubrication of coal mine equipment.

HULBURT *Quality* GREASE

HULBURT OIL & GREASE COMPANY . . PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

NOW...ANOTHER REVOLUTIONARY PRODUCT OF PHILCO BATTERY RESEARCH!

The New "PHILCO Thirty" gives 30% Longer Life

A few months back Philco pioneering gave industry the outstanding development in stationary batteries—Philco Vitrabloc. Today, Philco engineering research scores again—with the top advance in mine locomotive and shuttle car batteries—the new "Philco Thirty." With 30% longer life, and *more*—with new economy in maintenance and lower depreciation—here is headline battery news. Here, for the first time in any battery, is a revolutionary new principle of fabricated insulation—developed, proved and backed by Philco. Here, too, is that famous 10% extra work capacity made possible by Philco's modern plate design. Ready today, is this great new post-war battery—the new "Philco Thirty"—now available in certain types and limited quantities. Write for full information.

PHILCO CORPORATION, *Storage Battery Division, Trenton 7, New Jersey*

For 50 Years a Leader in Mine Storage Battery Development

Coal Age

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Volume 49 — **OCTOBER, 1944** — *Number 10*

COALMASTER CUTS STRAIN ON DRILL AND DRILLER —STEPS UP SPEED AND SAFETY

Drilling blast holes with Coalmaster Tools is *faster* and *safer* because:

(1) They are expertly engineered to require less power. You can do a cleaner, quicker job without increasing the load on drill or operator.

(2) The patented Hexagon Coupling reduces auger changing time and speeds up drilling 10% to 30%.

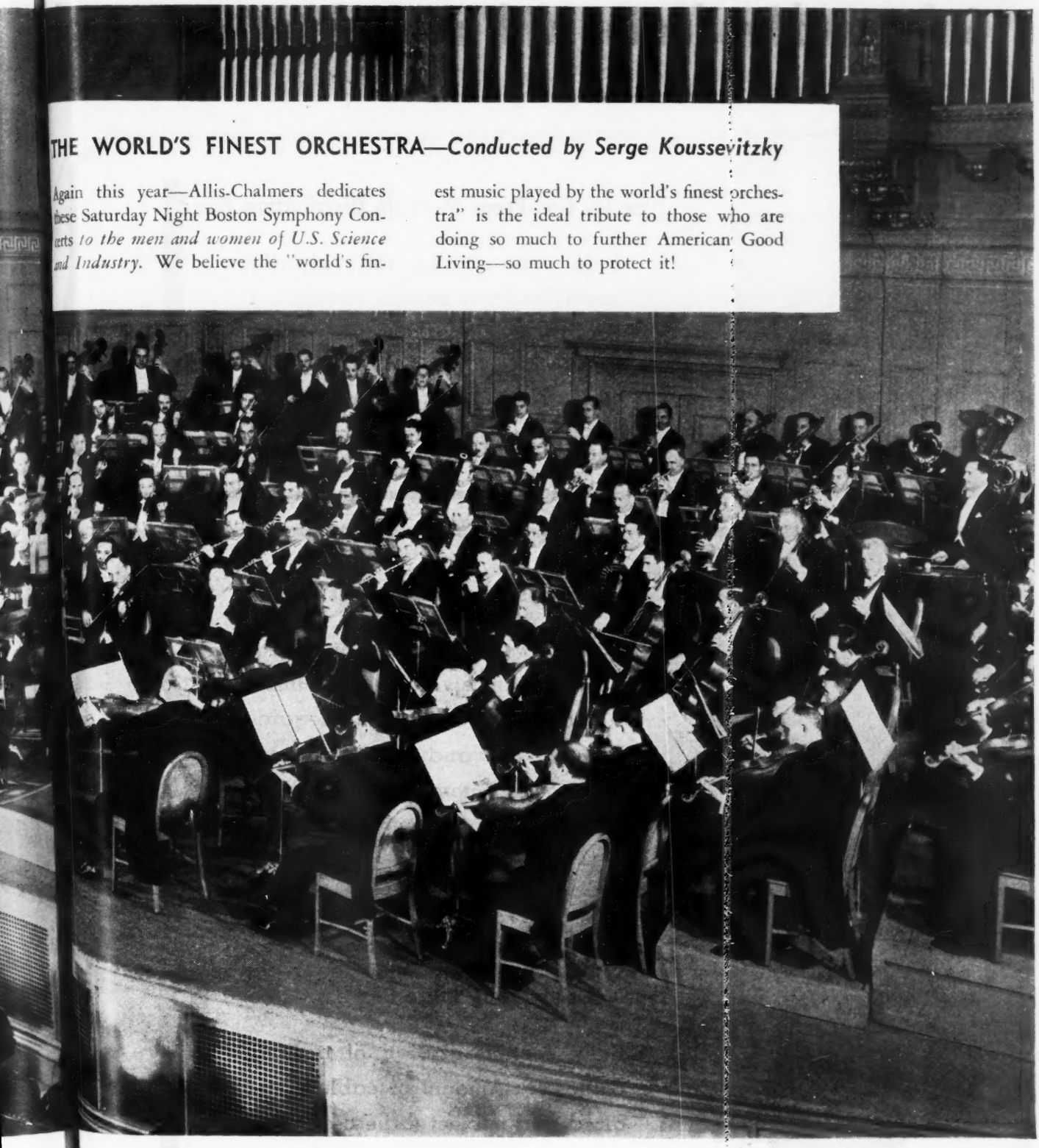
Your drillers feel less fatigue—more security; *you* profit from increased tonnage at decreased cost. Write us your requirements—we'll be glad to suggest the tools best suited to your needs.

DRILLING COALMASTER TOOLS

CENTRAL MINE EQUIPMENT CO.

ST. LOUIS 8, MO.

M (W.T.) over 189 stations of the Blue Network



THE WORLD'S FINEST ORCHESTRA—*Conducted by Serge Koussevitzky*

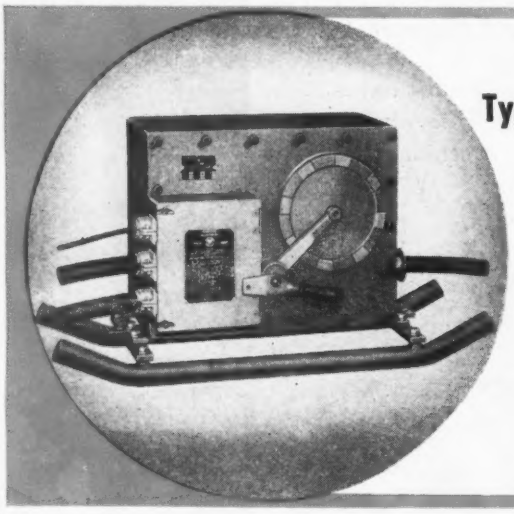
Again this year—Allis-Chalmers dedicates these Saturday Night Boston Symphony Concerts *to the men and women of U.S. Science and Industry.* We believe the "world's finest music played by the world's finest orchestra" is the ideal tribute to those who are doing so much to further American Good Living—so much to protect it!

LMERS

"Engineering That Aids All Industry Furthers American Good Living"

HOW TO HANDLE POWER IN

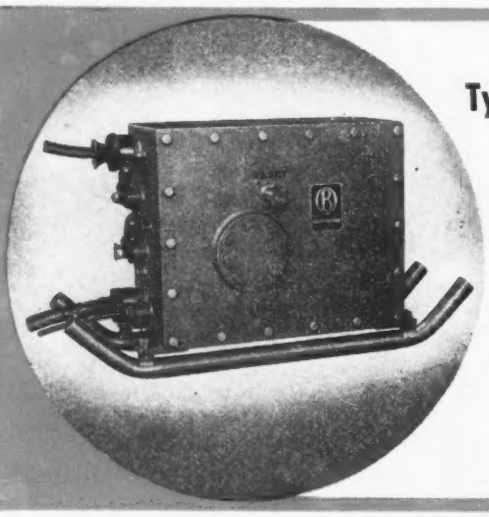
Safeguard Production with a Complete O-B Control



Type LG Gas-Proof Multiple Distribution Box

1

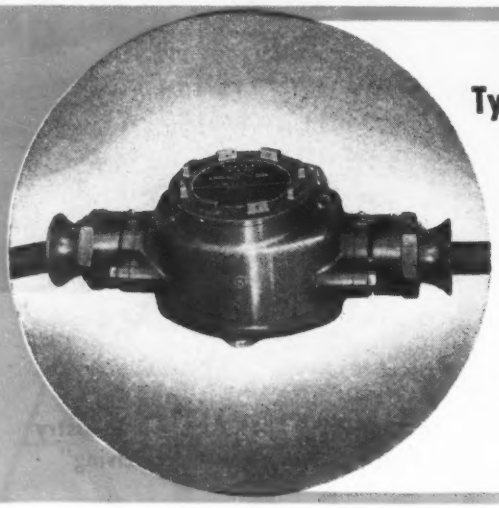
Safe connections, individually fused, for three branch circuits . . . Fool-proof interlock protects workmen from electrical hazard . . . Light weight and small-sized, skid-mounted case for handling ease.



Type BDG Gas-Proof Motor Starter

2

Overload and short circuit protection for expensive face machinery . . . Will start automatically regardless of load and restart following power interruptions . . . May be equipped for remote control.



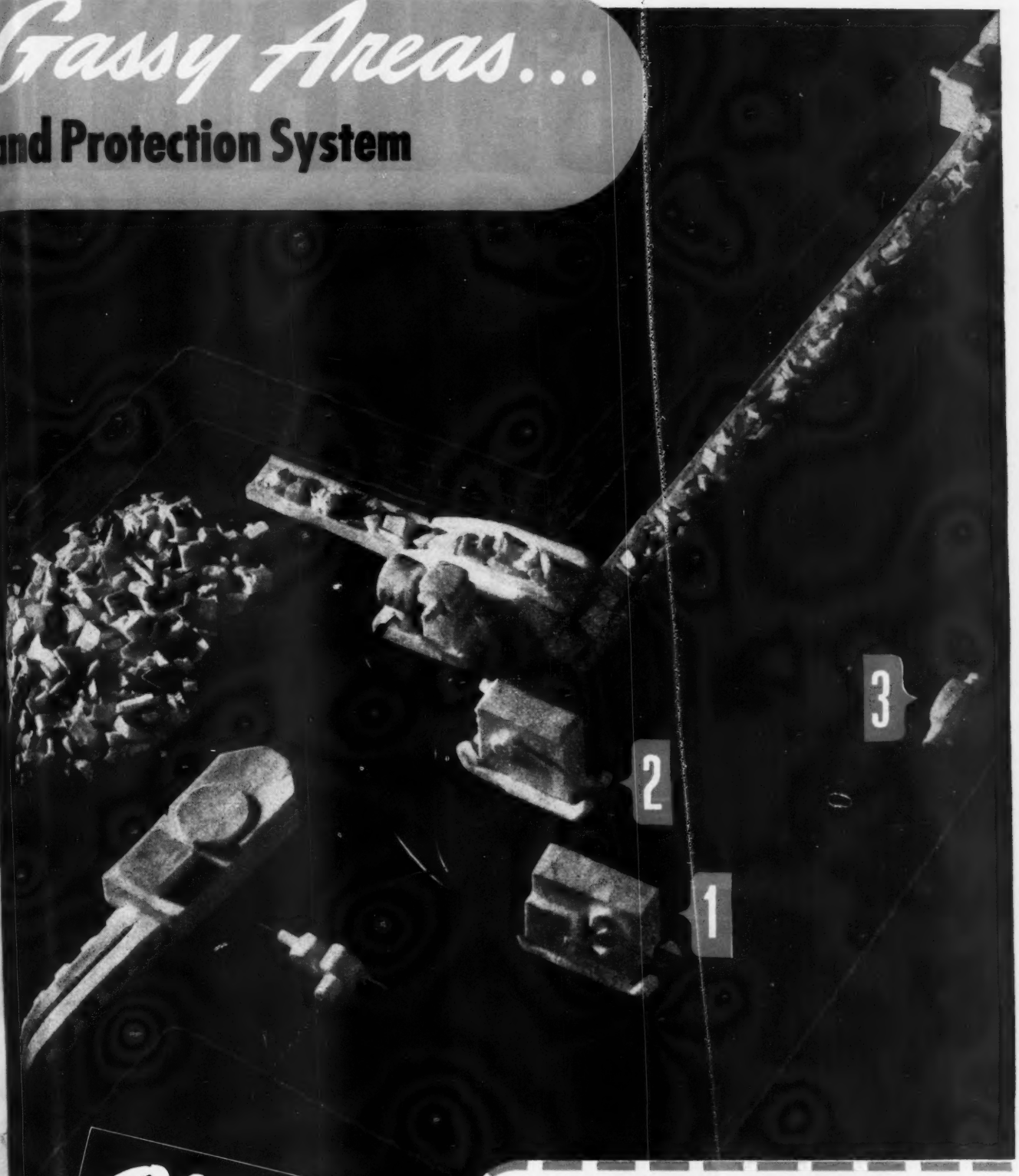
Type FG Gas-Proof Splice Box

3

Easy sectionalization of trailing cables . . . Amount of cable energized and subject to heat deterioration kept at minimum . . . Defective cable sections quickly removed for repair with minimum shut-down.

Gassy Areas...

and Protection System



Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

KEEP BUYING WAR BONDS

Clip and Mail for Complete Story

OHIO BRASS COMPANY • Mansfield, Ohio.

I'd like to have more information regarding a complete control and protection system. Please send copies of the following booklets: (Check below)

- ☐ 780M—Type LG Gas-Proof Multiple Distribution Box
- ☐ 768M—Type BDG Gas-Proof Motor Starter
- ☐ 778M—Type FG Gas-Proof Splice Box

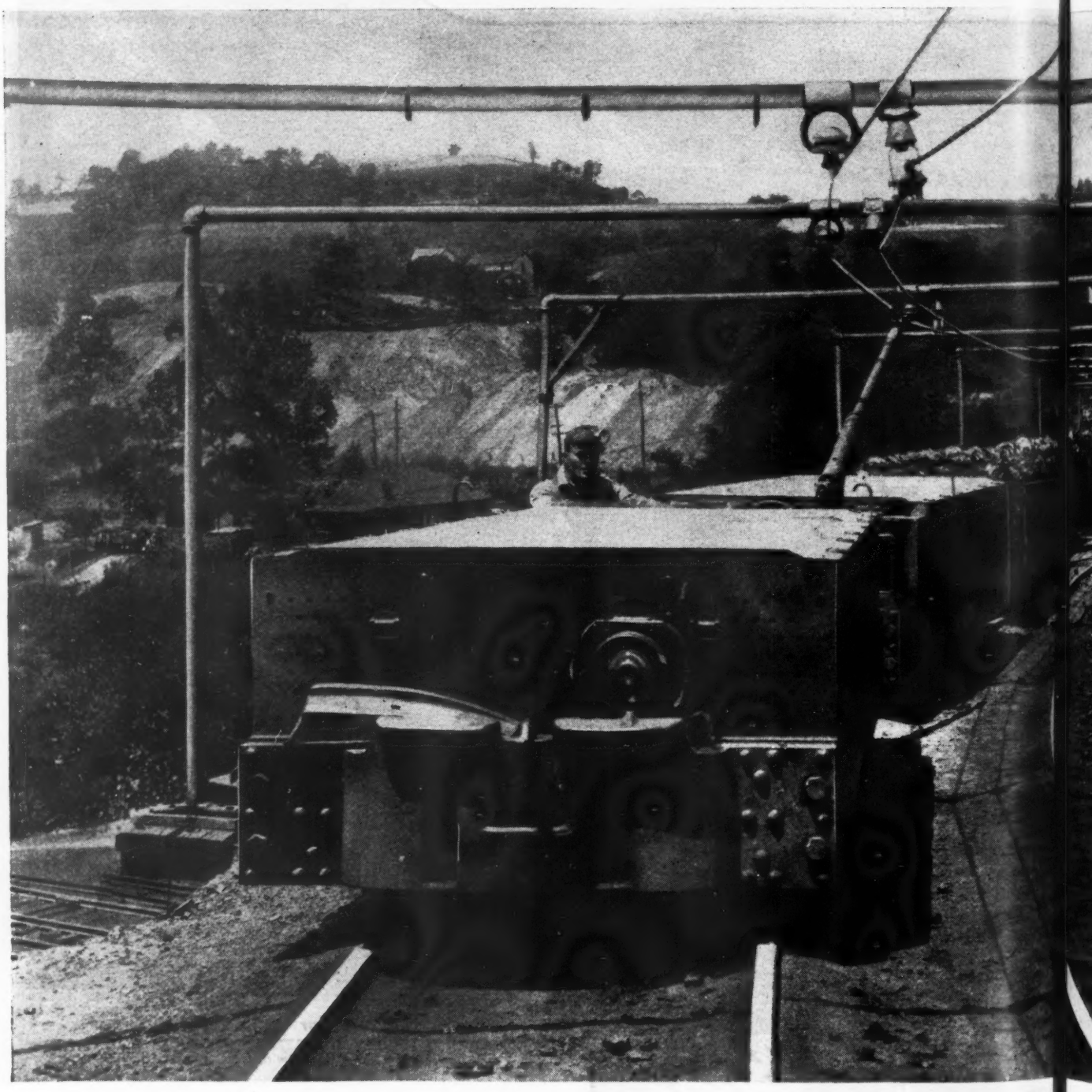
Name _____

Title _____

Company _____

Address _____

ASSURING



TEXACO

REG. T. M.

TEXACO LUBRICANTS

LOCOMOTION

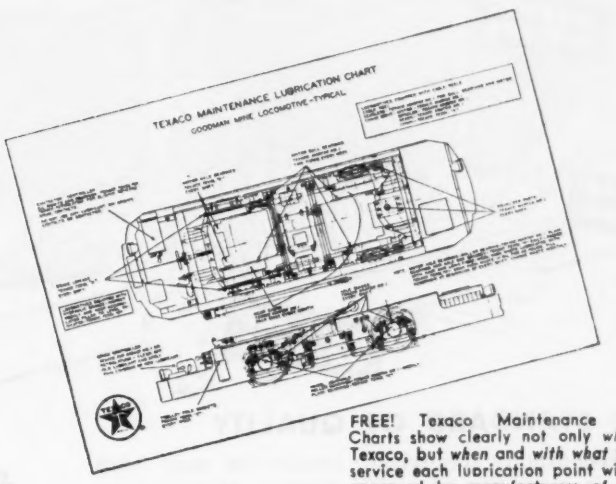
MAINTAINING steady transportation to the surface is as important as maintaining production at the face. To move today's tonnage, mine locomotives must haul more and heavier loads.

Smooth and dependable operation of transportation equipment and other mine machinery is materially aided by *effective* lubrication . . . TEXACO.

Texaco Starfak for example, provides effective lubrication over a wide range of temperature conditions for grease-lubricated ball and roller bearings of electric motors used in locomotives, cutters, loaders, shuttle-cars, etc. *Starfak* resists separation, leakage, oxidation, therefore, makes bearings last longer.

Texaco lubricants are approved by all leading makers of mechanized equipment, who have cooperated with us in producing Texaco Maintenance Lubrication Charts.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, *National Sales Division,* Dept. C, 135 East 42nd Street, New York 17, N. Y.



FREE! Texaco Maintenance Lubrication Charts show clearly not only *where* to use Texaco, but *when* and *with what* lubricant to service each lubrication point with products approved by manufacturers of all leading makes of cutters, loaders, locomotives, etc. Order the Charts you need by make and model.

ITS for the Coal Mining Industry

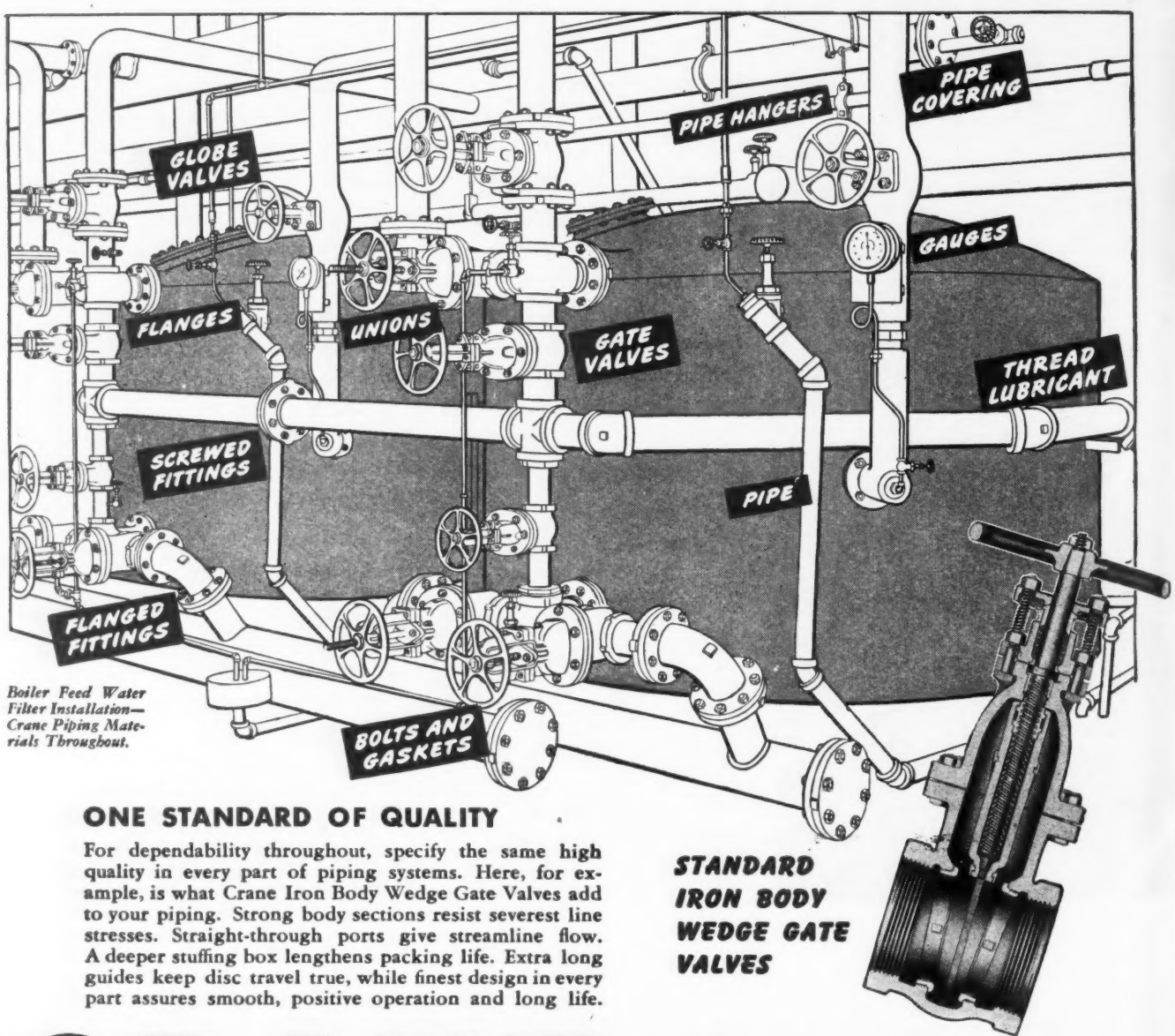
You name the Piping Service CRANE supplies the Equipment

ONE SOURCE OF SUPPLY . . . ONE RESPONSIBILITY FOR ALL MATERIALS

Valves—fittings—pipe—fabricated assemblies—and piping accessories—for power or processing lines—high, moderate, or low pressure—all your needs for any installation are available from a single source: Crane. Just name the fluid to be handled—your Crane Branch offers the world's greatest selection of quality materials—in brass, iron and steel—for every piping service.

Better installations start with parts whose quality and craftsmanship are backed by a single responsibility. Ordering, maintenance work, storing of parts and getting emergency replacements—all such steps are simplified by Crane *complete* materials service. Your satisfaction with Crane products is assured by Crane Co.'s 89-year experience and leadership in the piping equipment field.

CRANE CO., General Offices: 836 South Michigan Avenue, Chicago 5, Illinois. *Branches and Wholesalers Serving All Industrial Areas.*



Boiler Feed Water Filter Installation—Crane Piping Materials Throughout.

ONE STANDARD OF QUALITY

For dependability throughout, specify the same high quality in every part of piping systems. Here, for example, is what Crane Iron Body Wedge Gate Valves add to your piping. Strong body sections resist severest line stresses. Straight-through ports give streamline flow. A deeper stuffing box lengthens packing life. Extra long guides keep disc travel true, while finest design in every part assures smooth, positive operation and long life.

STANDARD IRON BODY WEDGE GATE VALVES

CRANE

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

SULLIVAN

LOHITE LOADERS GIVE YOU . . .

A FULL LOAD

There's only one thing that can slow down loading with a Sullivan Lohite Rock Loader—the speed of the car service. Just as quickly as an empty car can be shunted under the boom, the Lohite has a full load, ready and waiting.

The Sullivan Lohite is another Sullivan product engineered for the job. Its low overall height, fast loading speed and

mobility makes it ideal for digging, conveying and loading rock, when brushing top, lifting bottom or loading in a rock heading.

The Lohite Rock Loader, in a complete unit, ready to operate, is available with either two or three drum Sullivan scraper haulers, in sizes up to 75 hp. Write now to learn how the Lohite and other Sullivan loading equipment can cut loading time and costs in your mine. Sullivan Machinery Company, Executive Offices, Michigan City, Indiana. In Canada: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.

FOR EVERY CAR!

SULLIVAN

OFFICES IN:

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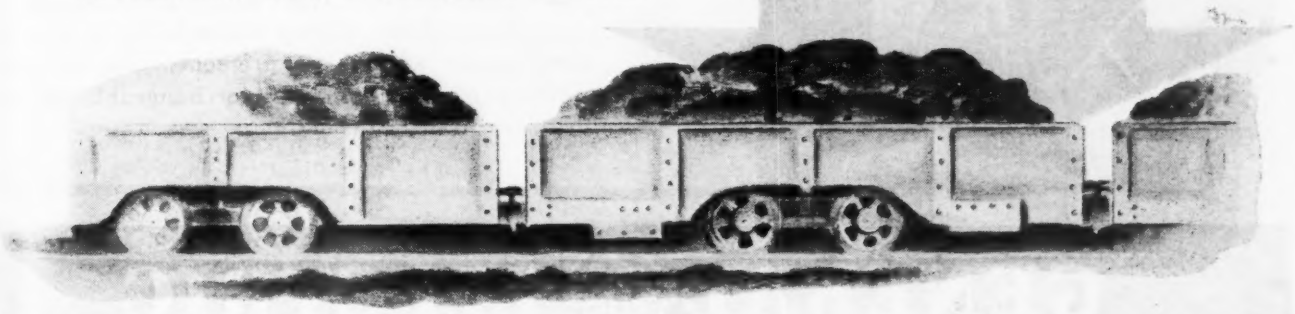


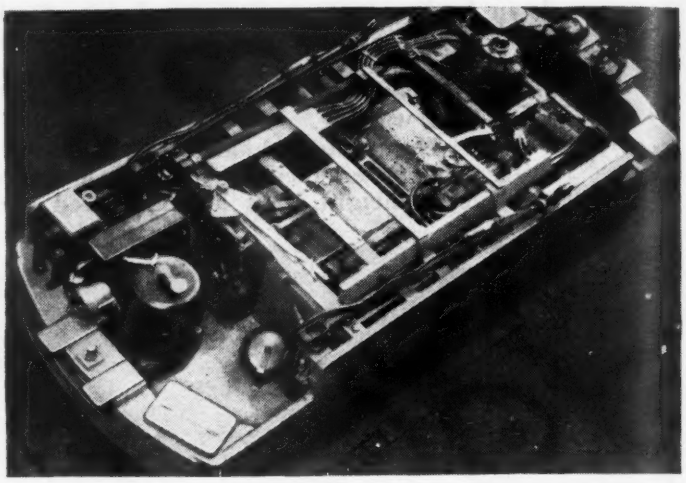
SCRAPER LOADERS · SHOVEL LOADERS · LOHITE LOADERS

"HUNG RIGHT" to

SIDE-EQUALIZED coil-spring suspension and centrally hung motors give G-E mine locomotives fine balance, distributing the weight equally on the drivers. That's why many mine operators have found that they speed up operation and at the same time reduce derailments. The smooth-riding characteristics of G-E locomotives have also proved a big factor in lowering track maintenance.

All main and component parts in G-E mine locomotives are designed by G-E engineers and *built in General Electric factories.* This coordination of the technical skill of specialists on motors, control, and locomotive construction results in the production of haulage equipment and accessories of highly reliable design, both mechanically and electrically.

There is no better time than right now to call in G-E engineers for a discussion of your present and future plans to modernize your locomotive. Just phone the G-E office nearest you. *General Electric Company, Schenectady 5, N. Y.*



Eight-ton, sealed-equipped G-E locomotive with cover removed to show motor and spring suspension.

Note also the squeeze-grip brake lever, which assures fast, positive brake manipulation. Both lever and controller handle are conveniently located to further facilitate fast, accurate spotting of cars.

Frames of all G-E mine locomotives are cut from solid, rolled-steel plates to insure strength. All wearing parts are easily accessible for inspection and maintenance.

The mining industry is installing almost as many locomotives of this type as all others combined.

CURB SERVICE. A G-E storage-battery mine locomotive entering a G-E equipped battery-charging station. Inset shows the recharging unit, consisting of a G-E 20-kv motor-generator set and magnetic switch mounted on portable frame.

PERIODICAL RECHARGING of storage batteries is easily and economically accomplished "on location" with G-E automatic battery-charging equipment. Charging methods perfected by G.E. assure the longest possible battery life, because they conform to the battery manufacturers' recommended procedure. Automatic operation, including cut-off when batteries are fully charged, relieves the operator of responsibility. Every electrical safeguard is included to protect both operator and batteries.

In addition to storage-battery locomotives of many standard sizes, G.E. builds combination battery-trolley units, types carrying the battery on a trailer, and two battery locomotives coupled in tandem for special requirements. For multiple-shift operation, duplicate, interchangeable box and battery can be furnished.

GENERAL ELECTRIC

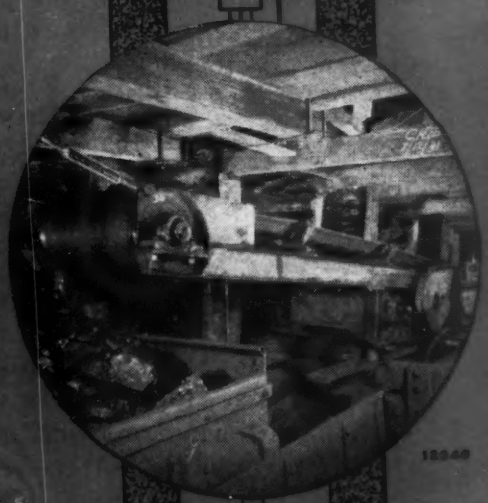
ER CONVEYORS

This 3-entry system is just one of many development plans in successful operation. There is also a wide variety of applications for room production. A Goodman sales engineer will be glad to help you select the most efficient one for your mine.

COA FROM FACE TO MINE CAR

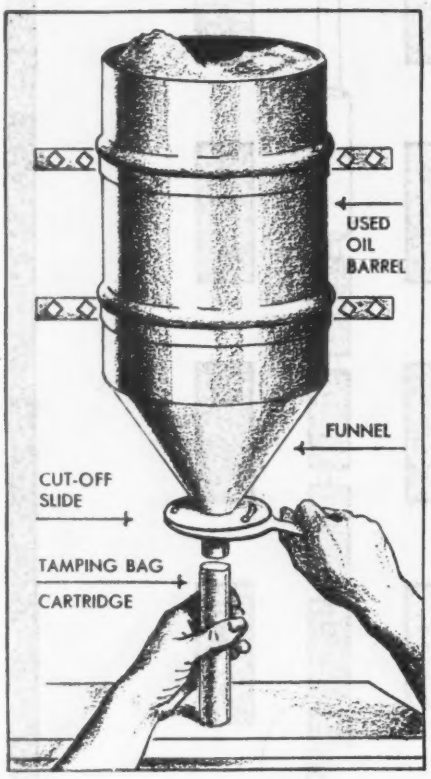
BELT CONVEYOR

Coal gathered by Shaker Conveyor units transported to main entry by belt.



ANY HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

Notes to Shot-Firers—



Use Home-Made Tamping Bag Loader to Encourage Safety and Increase Production

Plenty of tamping bags at the face, filled and ready for use, encourage good stemming—a practice that pays in safety, in production, and in lowered fumes and smoke. Save time by using this simple device for filling tamping bags with stemming material—a loader made of a used oil barrel and a funnel. An unskilled man working in his spare time can keep enough tamping bags made up for a good-sized mine.

Several mines are already using this tamping bag loader successfully. Build one for your own use, and keep these three practical suggestions in mind:

1. ***Use the most effective stemming material.*** A 3:1 sand-clay mixture is generally considered excellent stemming material.

2. ***Use tamping bags of the proper diameter.*** Tamping bags should be as near the bore hole size as possible. The right diameter tamps better.

3. ***Keep enough tamping bags at the face.*** Good stemming prevents blown-out shots, keeps fumes and smoke at a minimum, and decreases the amount of explosive required. An adequate supply of filled tamping bags readily available encourages proper stemming.

Little profit-making suggestions like these are frequently made by Atlas technical representatives as they visit mines. On many jobs, synergistic* thinking about the problem—with Atlas men exchanging ideas with the customer—has led to savings in time, manpower and materials. Talk things over with the experienced Atlas representative on his next call.

***Synergism:**

The force that produces a "2+2=5" result, so to speak, when both you and we get together and really "click".

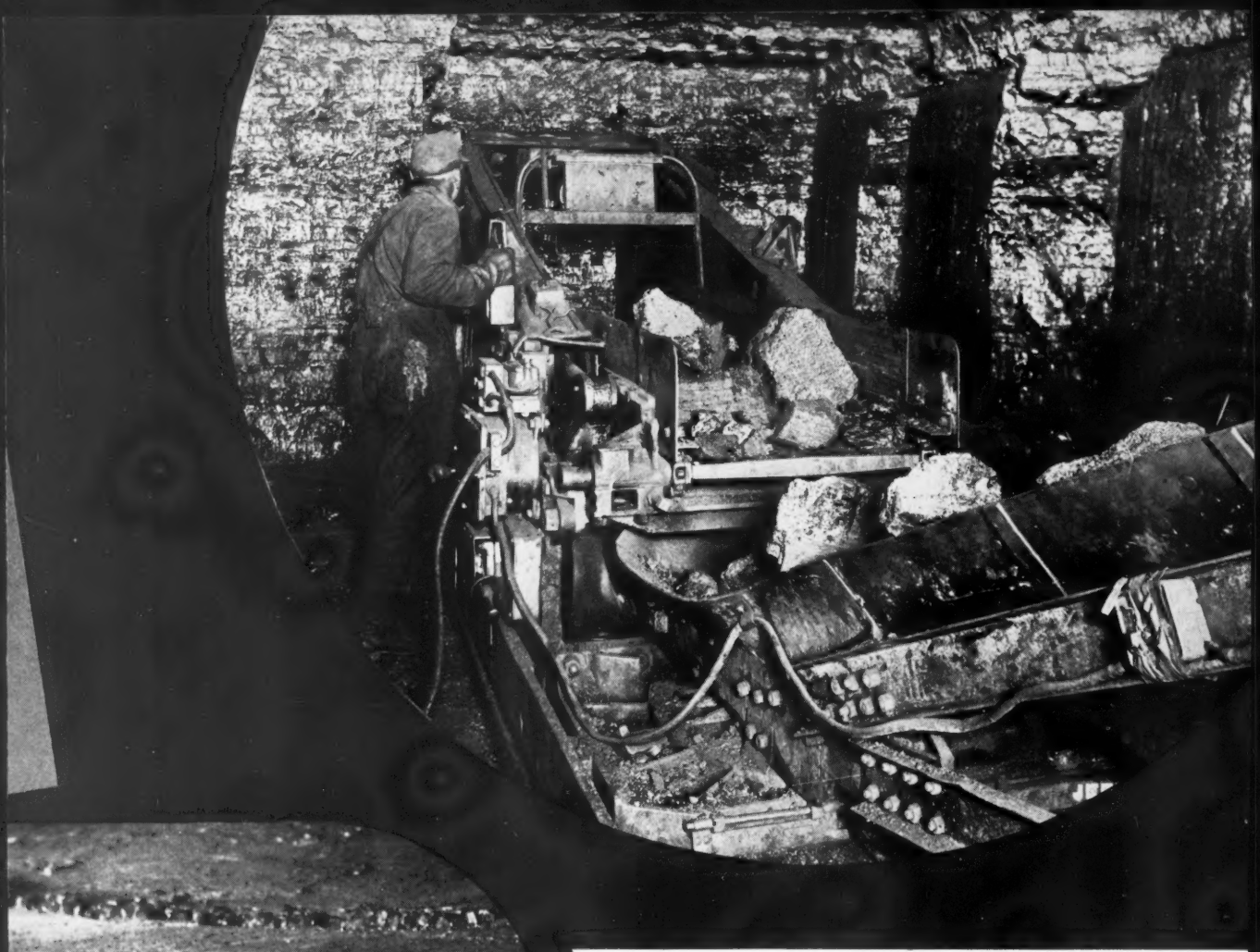
ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco


The Development of
JEFFREY
MECHANICAL
LOADERS
marks an outstanding advance
in Coal Production



JEFFREY PROGRESS

As transportation and cutting methods improved the development of mechanical means of loading became necessary to meet the increasing demand for coal at prices that could meet competitive fuel costs.

Jeffrey — with long and varied experience in the design, development and construction of coal mine equipment — was among the first to produce a mechanical coal loader.

For modern coal loading methods — consult a Jeffrey Engineer.

SS

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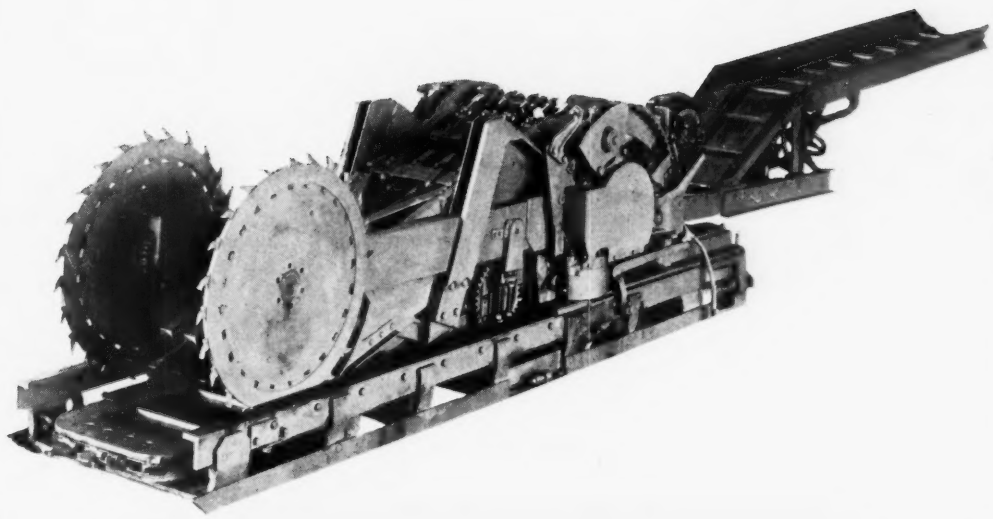
JEFFREY

Mechanical Mine Equipment Since 1880



One of the first

JEFFREY

Mechanical Loaders

BUY WAR BONDS

Mine Lubrication *News*

Practical suggestions from the field on how Lubrication Engineering and lubricants are being used by midwest mine operators to lick tough jobs.

OCTOBER, 1944

Keeps hoist drum bearings cooler in heavily loaded dragline.

Main bearings on a dragline hoist drum in an Illinois pit mine normally ran moderately warm. But when it was necessary to operate for long periods under heavy loads the bearings became dangerously hot. A Standard Oil Lubrication Engineer found there was nothing wrong with the bearings. He recommended a grade of Superla Grease designed for heavy loads. Now bearing temperatures are normal under all conditions. The operator gets maximum output from the shovel when it is needed.

Brake band replacements cut 50% with Superla Mine Loader Lubricant.

In two years, since Superla Mine Loader Lubricant was installed in Joy loaders at a midwest mine, not one breakdown has occurred because of lubricant failure. In that same time brake band replacements have been cut in half. This mining company has several operations scattered throughout the Middle West. One after another of these operations adopted Superla Mine Loader Lubricant as they heard of its remarkable low maintenance record. Make a test in your loader. There are five grades of Superla Mine Loader Lubricant to meet any condition, age, or type of loader in your mine.

One application of Calumet Viscous Lubricant to gears lasted 14 times longer . . .

Open gears in a Kansas operation had to be lubricated daily with a well-known gear shield. A test of Calumet Viscous Lubricant 10X was arranged in an attempt to reduce this time-taking job. The plant personnel found three reasons for keeping Calumet permanently. (1) It stayed on the gears and off the floor and machines. (2) It was easier to apply. (3) One application lasted two weeks instead of one day, as had been the case with the former lubricant.

One-third as much oiler time needed.

Screen eccentric bearings "just naturally ran hot." At least that is what the superintendent in an Illinois strip mine had decided. But when a modern coal washing plant was installed and the new eccentrics also overheated he began to think it wasn't "natural."

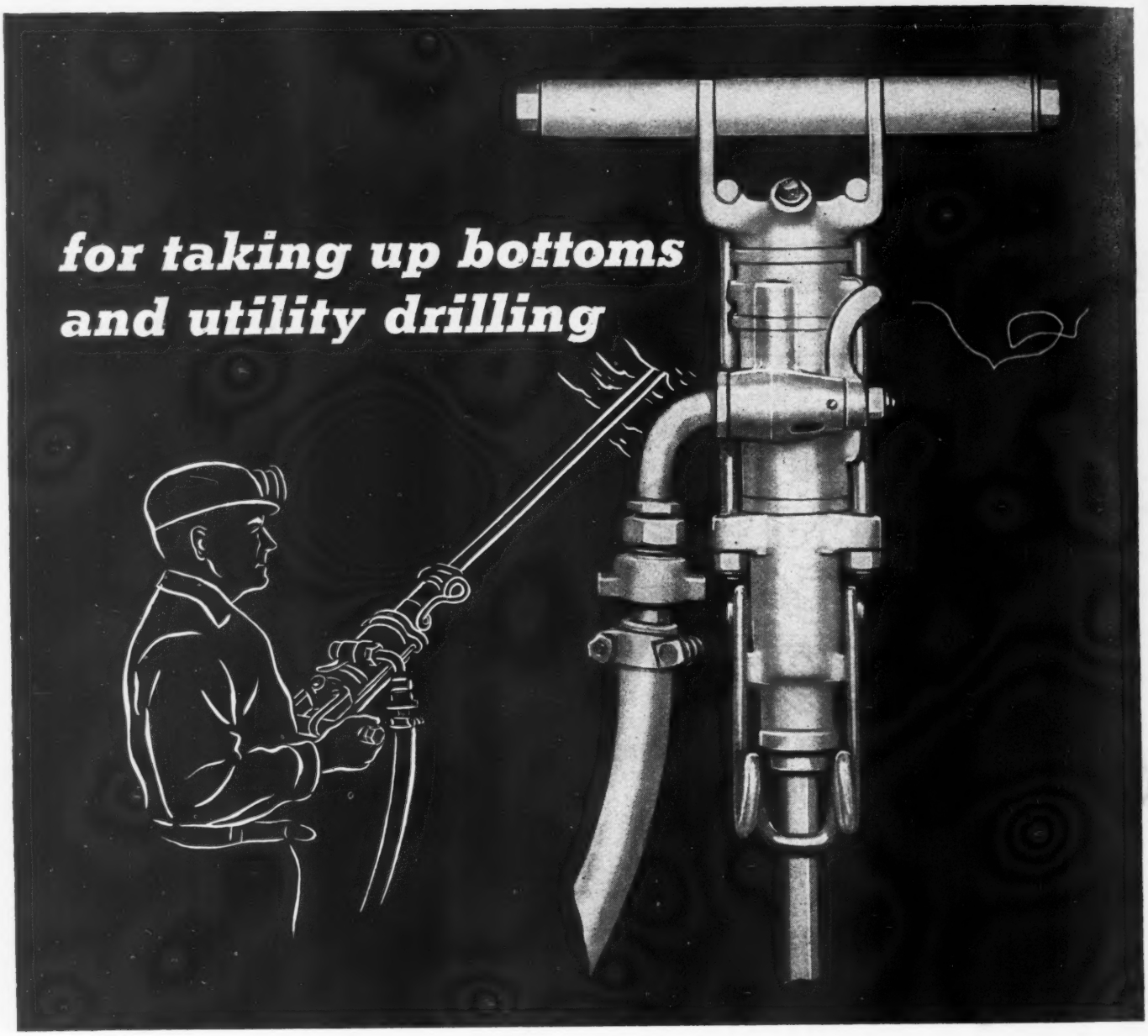
He decided to try the suggestion of a Standard Oil Lubrication Engineer: "Use a good quality of grease and see if it doesn't save enough maintenance, oiler time, and grease to more than save the difference in price." The Engineer recommended Superla Grease. The first test was thoroughly convincing. Superla lasted 3 to 5 times longer than the grease originally used. The oiler spent less than ⅓ as much time lubricating the equipment.

You can get the same Lubrication Engineering Service that helped solve the few examples cited above. They are only typical of the daily problems each of the many Standard Oil Lubrication Engineers—located throughout the 13 states indicated on the map—are called upon to solve. You can reach one of these Engineers by calling the nearest Standard Oil Company (Indiana) office, or writing 910 South Michigan Avenue, Chicago 80, Illinois. In Nebraska, write Standard Oil Company of Nebraska at Omaha 2.

Gasoline Powers the Attack . . . Don't Waste a Drop!

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ LUBRICATION ENGINEERING



LIGHT-WEIGHT CP-22 SINKER

WITH its high drilling speed, good hole cleaning and low air consumption, the 28-lb. CP Sinker is an exceptionally efficient tool for its weight. It is ideal for taking up bottoms, brushing down, drilling coal and general utility work. Long life and low maintenance are assured by full cushioning, automatic lubrication and other Chicago Pneumatic features. Write today for further information.

CP makes a sinker drill for every purpose from the light 28-pound CP-22 to the 119-pound heavy duty CP-60. Write for a copy of Bulletin No. 850.

★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

NOW TOUGHER THAN EVER

Armored with RAYOTWIST CORD for still greater strength!

HEAVY-DUTY FEATURES of the Goodyear HARD ROCK LUG TIRE

1 Massive lug-bar tread

2 Extra-thick undertread

3 Tread-armored sidewalls

4 Super-strong Rayotwist cord carcass

LONG the sturdiest rock tire built, Goodyear's great Hard Rock Lug tire is tougher than ever today. That's because it is now built with Rayotwist cord — Goodyear's patented rayon cord — *the strongest cord ever used in a work tire.* Now, it's doubly armored for more ton-miles' service over the hardest going.

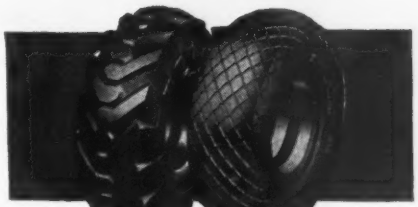
Years of experience have already proved that the massive, wide-based lug bar tread is the surest-footed, most bruise-proof for rock work. And note how those heavy lugs extend deep down over the sidewalls — additional armor against cutting and snagging.

Goodyear design makes the Hard Rock Lug tread one that is universal, two-way, with no rights, with no lefts. That means you can count on the same powerful grip in reverse that you get forward. The straight, wide, V-shaped grooves are open at the ends and at the right angle to force out dirt and stones as the wheel revolves.

Wherever you need tough tires you will find the new Rayotwist-armored Goodyear to be the sturdiest, longest-wearing tire built from materials available today, including a compulsory amount of synthetic rubber. Now as always, it's first-choice for hard jobs.

BUY WAR BONDS — BUY FOR KEEPS

THERE'S A GOODYEAR FOR EVERY JOB



For traction in soft going specify
Goodyear Sure-Grip

For drawn dirt-movers specify
Goodyear All-Weather Earth-Mover

Rayotwist, Sure-Grip, All-Weather—T.M.'s The Goodyear Tire & Rubber Company

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

ROME "60-38" vs. TENSION & TORSION

ROME "60-38"
Single Conductor
Locomotive
Gathering Cable

Westinghouse 8-ton cable reel locomotive serving mechanical loading machine at face, feeding empty cars to loader, hauling loaded cars to relay locomotive haulage road in Maiden Mine of Kelly's Creek Colliery Co. Rome "60-38" cable is shown in use.

Tension and torsion . . . twin enemies of locomotive gathering cables . . . are up against the toughest kind of competition in Rome "60-38" Single Conductor Locomotive Gathering Cables.

"This cable's got everything it takes to stand rough treatment," says *Romey

*Copr. 1944 RCC

THE CONDUCTOR is composed of rope stranded, tinned copper wires. The individual ropes are laid up in a special manner to resist both tension and torsion.

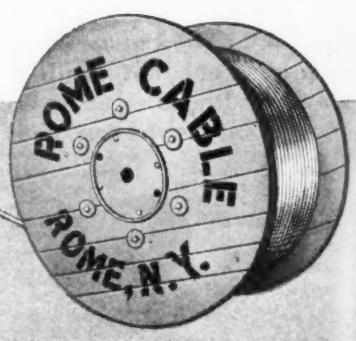
A SPECIAL INSULATION is used, which has high electrical qualities and extreme adhesion to copper conductor.

HEAVY TWINE REINFORCEMENT CORDS are applied over insulation to strengthen the cable and control adhesion between insulation and jacket.

THE NEOPRENE JACKET is vulcanized in continuous lead molds and has a high tensile strength, maximum resistance to tearing and abrasion, and long aging characteristics.

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION
ROME • NEW YORK



THE SHOVEL WITH A BOARDING HOUSE REACH!"

It stacks away a lot of yardage in high places

To master a specific type of material handling, MARION developed the long-reach, high-lift shovel shown below. It is one of the most powerful machines for its size ever built.

It strips deep, tough, rock filled overburden from the working face of coal seams, lode veins, clay deposits and rock beds and disposes of it on top of high spoil banks and does the job speedily and at low cost.

The exceptional mobility of this BIG, little MARION has been proven under all pit conditions.

MARION engineers will gladly tackle your material handling problem.

It Pays To Modernize With MARIONS

THE MARION STEAM SHOVEL COMPANY • MARION, OHIO

ANOTHER **MARION** ACHIEVEMENT

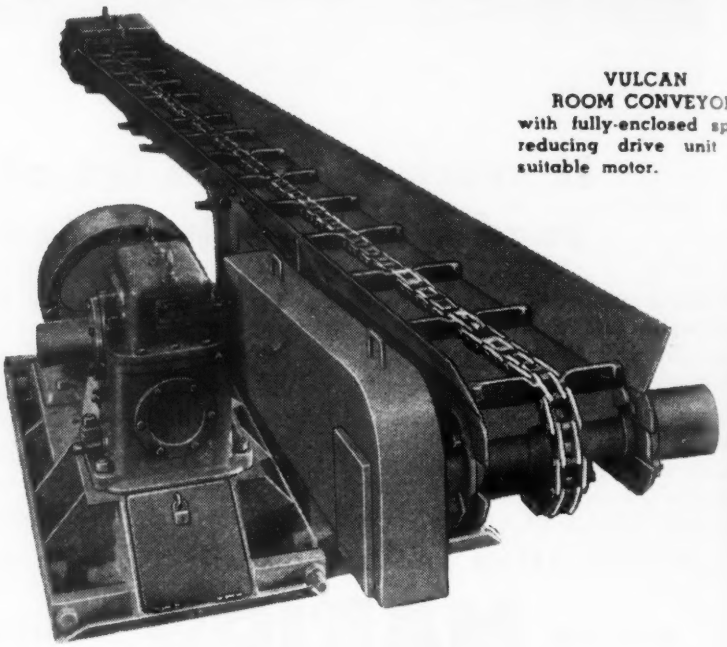
CRANES • PULL-SHOVELS
CLAMSHELLS • SHOVELS
DRAGLINES • WALKERS

For Every Material Handling Job

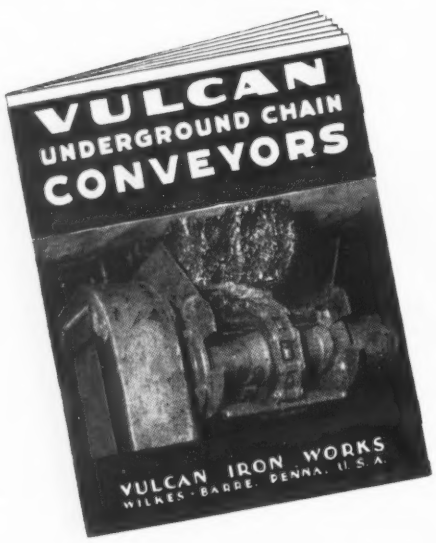
BUY WAR BONDS

CHAIN CONVEYORS

to meet the Severest Requirements of Modern Mechanized Coal Mines



VULCAN ROOM CONVEYOR with fully-enclosed speed-reducing drive unit and suitable motor.



This Vulcan Chain Conveyor Bulletin contains large clear illustrations and concise descriptions of all standard parts and assemblies, together with engineering drawings and complete working data. Easy to read and easy to understand. Write for free copy. No charge or obligation of any kind.

WIDELY known for many years as manufacturers of sturdy Shaking-Chute Conveyors the Vulcan Iron Works has also developed, within recent years, a complete line of Underground Chain Conveyors embodying the same high standards of quality and the same extra margins of strength and capacity that have distinguished all other Vulcan products for more than ninety years.

Hundreds of successful installations in both anthracite and bituminous mines now enable us to offer Vulcan Chain Conveyors as a thoroughly "seasoned" product with proved ability to meet the severest requirements of modern mechanized coal mines for either face, room, gathering or elevating service. Deliveries are subject to approval of the War Production Board but inquiries are cordially invited and will receive prompt attention from our experienced engineers and executives.

VULCAN IRON WORKS

Established 1849

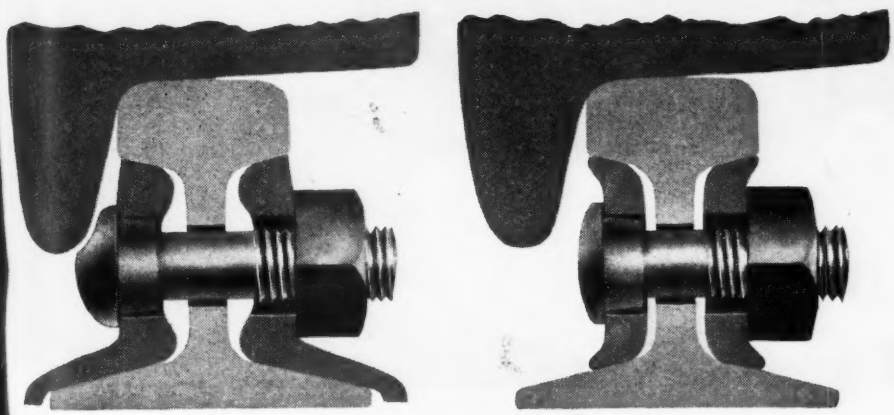
Main Office and Works **WILKES-BARRE, PA.,** New York Office 50 Church

Heavy-Duty Electric Hoists	Shaking-Chute Conveyors	Steam Locomotives	Load-Carrying Larries
Self-Contained Hoists	Chain Conveyors	Diesel Locomotives geared and electric drive	Rotary Kilns, Coolers and Dryers
Scraper Hoists	Cast-Steel Sheaves and Gears	Gasoline Locomotives geared and electric drive	Crushing Rolls and Pulverizers
Car-Spotting Hoists	Cages, Skips and Gunboats		Briquetting Machines
Room Hoists	Coal-Preparation Equipment		Ball, Rod and Tube Mills

SHOCKS JOLTS DAMAGE

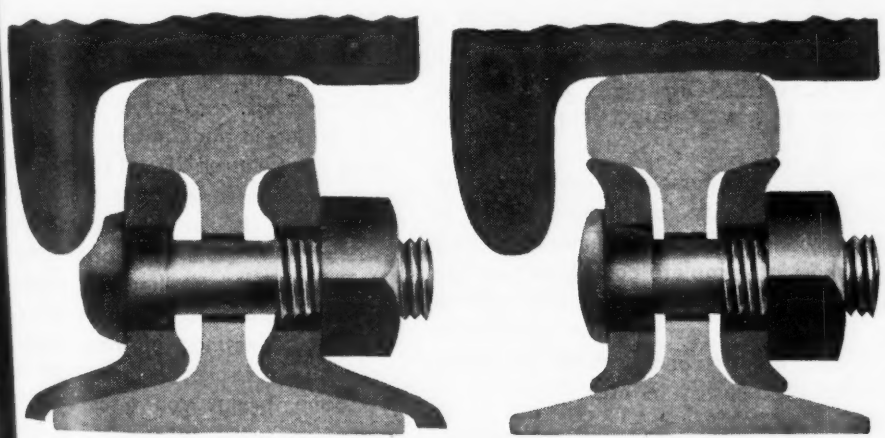
REDUCED BY

NEW TRACK BOLT AND SPLICE BAR DESIGN



NEW WHEEL

These drawings show the tread and flange of an unworn wheel—the type used with track-mounted cutters and loaders. Although the flange strikes the head of the old-style roundhead bolt, it easily clears the new-type bolt with new splice bar made by Bethlehem. This new design cuts down the loss of bolts when rails are moved.



WORN WHEEL

These are actual contours of a wheel worn down by long service. Here again, the advantages of Bethlehem's new track bolt and splice bars are apparent. At left, the old-style bars and bolt; at right, the new Bethlehem design, showing ample clearance.

Here's one of the greatest improvements ever made in equipment for 40-pound rail.

It's a new flat-headed track bolt that's built for use with special splice bars. The advantages of the combination are clearly shown in the accompanying scale drawings.

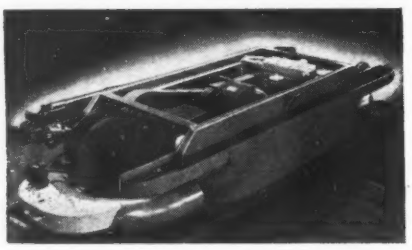
The conventional round-headed track bolt used with angle bars protrudes so far beyond the railhead that the deep-flanged wheels of heavy motors and cutting and loading machines cannot help striking it. This, in turn, results in jolts and jars that damage the bolts and necessitate replacements. Over a period of time, these shocks have an injurious effect on expensive control devices in the machines themselves.

But note how this tendency is reduced when Bethlehem's new track bolt and splice bars are used. The bars fit closer to the rail web, and the head of the bolt protrudes only a small fraction of an inch. Thus, with either a new wheel or a worn wheel, there is no possible chance for a deep flange to strike the bolthead.

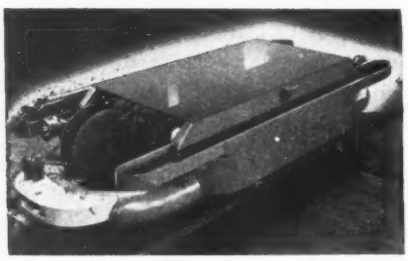
Bethlehem is now in a position to furnish this new equipment for 40-pound rail. Write to Bethlehem Steel Company, Bethlehem, Pa., for full particulars; or, let a Bethlehem man tell you the full story.

★ ★ BETHLEHEM STEEL ★ ★

Control end of Cantrell Type SP Compressor is shown above.



Cantrell SP Compressor with safety top removed



—with top in place

Give your drill crew a Cantrell SP and you give them the finest; the fastest; the most economical compressor known!

It Takes You There . . . Gets Its Job Done . . . Brings You Back—

—all under its own power

● TODAY, NO MINE IS FULLY EQUIPPED WITH ESSENTIAL OPERATING MACHINES WITHOUT A CANTRELL SELF-PROPELLED AIR COMPRESSOR! HERE ARE A FEW OF THE REASONS WHY.

• • •

Air compressor service is an absolute necessity for numerous jobs in any mine. Yet, many mines are falling short of complete compressor service simply because the time and expense required to get present compressor equipment to and from the job is too great to justify its use.

The Cantrell, Type SP, compressor is revolutionizing compressor service in coal mining. No longer need you tie up a costly locomotive with crew for moving an air compressor from job to job, along with an extra car for hauling tools and repairs.

The Cantrell, Type SP, is more than a heavy duty air compressor. It is a self-contained locomotive, capable of rapid tramming to any point. Upon arrival at job, power is instantly changed from tramming to compressor . . . as simply as changing gears in an automobile. In addition, space for hauling tools and repair equipment is provided in the Cantrell SP. Mines using the Cantrell SP will tell you it is indispensable to efficient mining. In addition to regular drilling work, you use the Cantrell SP for ditch lining, leveling haulways, hauling repairs, shifting pumps and mining machines, chipping, riveting, blowing substations, and, it takes you there, gets the job done, brings you back . . . all under its own power . . . a new, broader service in a complete air compressor. Write for complete details now, to Imperial Bronze Manufacturing Co., Jellico, Tennessee.

Cantrell
COMPRESSORS

What makes these Upson-Walton Shackles Better Shackles?

THERE are two ways to make shackles. One way is to set up shop and make them. The other way—the Upson-Walton way—is to engineer them as carefully and as thoughtfully on the drawing board as if they were airplane engines—long before they go to shop.

Check these Upson-Walton shackle specifications. They are some indication of how we are able to produce shackles that give *maximum satisfaction in actual use.* Better shackles—and better buys!

Steel Specifications: Upson-Walton specifies only specially selected, fine grain, higher tensile steels. These steels have superior forging qualities—give a more uniform product capable of developing more strength.

All Shackles are made to rigid United States government specifications on spreads and clearances.

Made in Solid Dies: All shackles in sizes up to and including 1⅛ inches are drop forged on solid dies. This process requires more expensive tooling, but the additional cost is absorbed in volume production. Upson-Walton shackles cost no more, but they are all uniformly better shackles.

Control Inspection: All Upson-Walton shackles are inspected 3 separate times before shipping. First, as they come from trimming; second, before and after drilling and tapping; and third, final inspection before shipping.

Galvanized Threading: All galvanized screw pin shackles have galvanized pins and galvanized threads. Galvanizing is done after threading, so it is not cut off on Upson-Walton shackles.

Uniform Threads: All thread tolerances are closely held—tight and firm, yet easy to engage.

AS WE GO TO PRESS, DELIVERIES ON UPSON-WALTON SHACKLES ARE GOOD

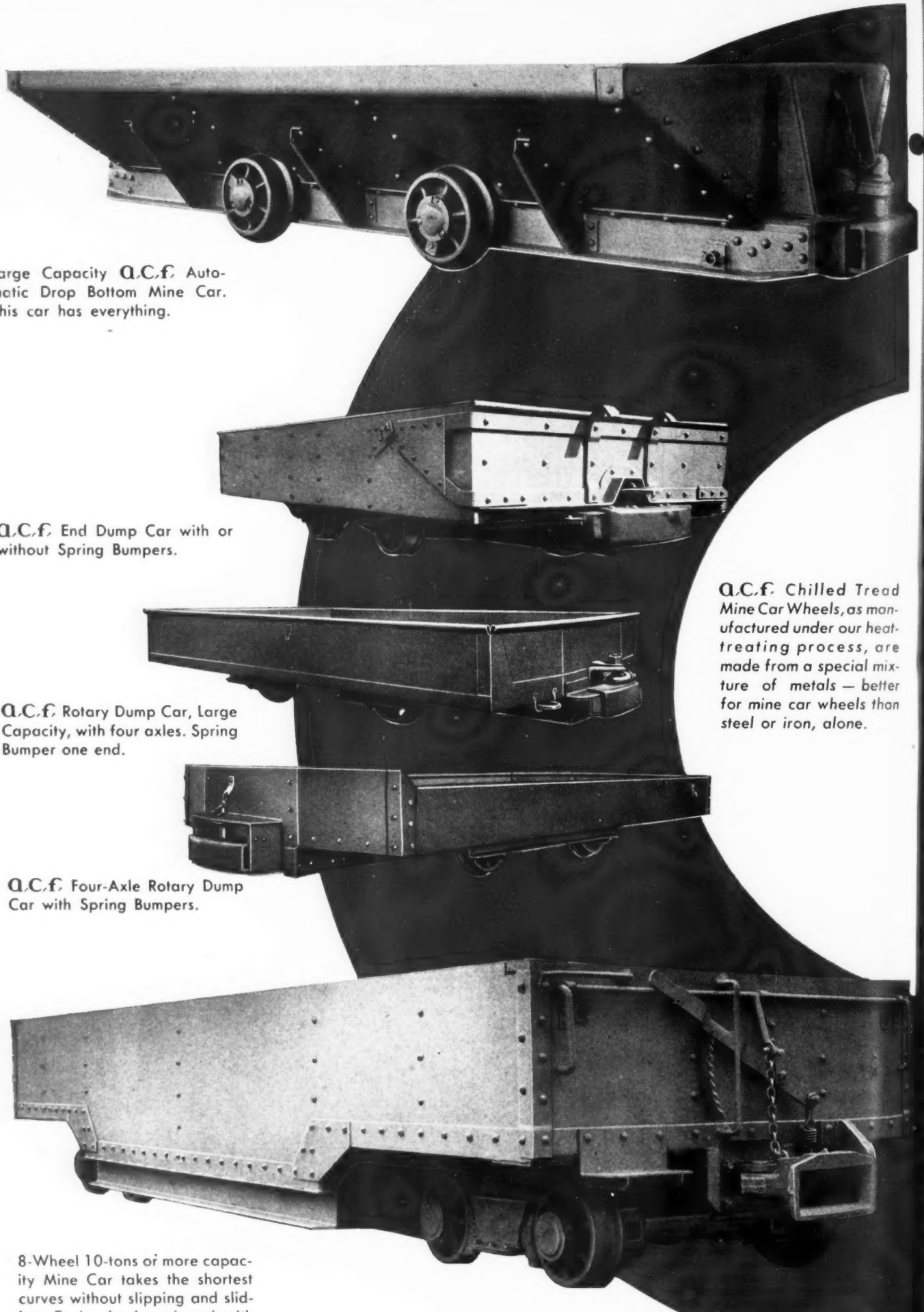
THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO

U-W

Established 1871



Large Capacity A.C.F. Automatic Drop Bottom Mine Car. This car has everything.

A.C.F. End Dump Car with or without Spring Bumpers.

A.C.F. Rotary Dump Car, Large Capacity, with four axles. Spring Bumper one end.

A.C.F. Four-Axle Rotary Dump Car with Spring Bumpers.

8-Wheel 10-tons or more capacity Mine Car takes the shortest curves without slipping and sliding. Each wheel equipped with anti-friction bearings.

A.C.F. *Chilled Tread Mine Car Wheels, as manufactured under our heat-treating process, are made from a special mixture of metals — better for mine car wheels than steel or iron, alone.*

...we have the car for YOUR JOB!

YOU SELECT the type of car you want, and we will make it fit your own particular operating conditions. Where coal production costs are too high, the right type of car can make a great difference.

If you are considering drop-bottom cars, **the A.C.F. car shown in the top illustration will give you everything you are looking for in a modern, efficient mine car.**

If your old cars must have new wheels and axles, **modern A.C.F. trucks with anti-friction bearings will meet the speed-up of the war demands—and will give you efficient equipment for years of later use at a great over-all saving.**

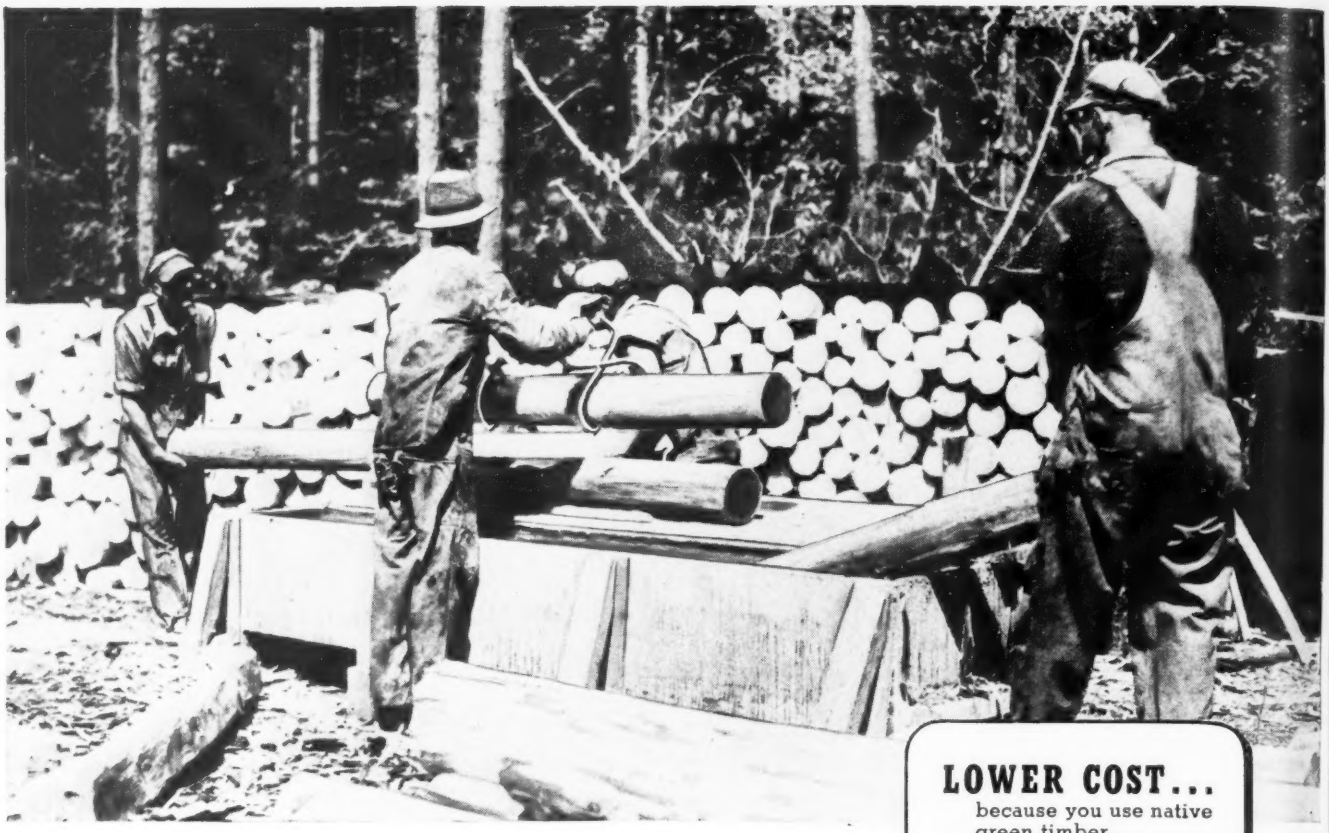
The delivery of complete cars depends, of course, upon receipt of materials, and on other conditions beyond our control. However, we will do our best to serve you. We can supply needed new wheels, trucks, axles, bumpers, and electrically welded end sill construction with spring bumpers to recondition your old cars.

A.C.F.

AMERICAN CAR AND FOUNDRY COMPANY

NEW YORK • CHICAGO • ST. LOUIS • CLEVELAND • WASHINGTON • PHILADELPHIA • PITTSBURGH • ST. PAUL • SAN FRANCISCO

It's just as simple as it looks . . .



LOWER COST...
because you use native green timber.

LOWER COST...
because handling and transportation costs are greatly reduced.

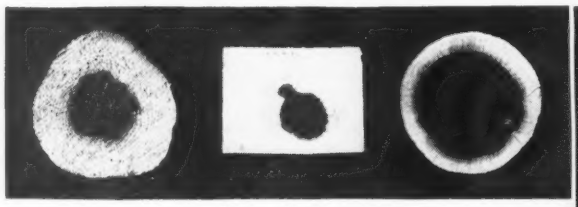
LOWER COST...
because no special, expensive equipment or heating apparatus is needed.

LOWER COST...
because it can be applied with any unskilled labor.

TREAT YOUR OWN TIMBER WITH OSMOSALTS

With Nature's Law of Osmosis doing most of the work, very little equipment is needed to treat mine timbers with OSMOSALTS. As the picture shows, only a wooden tank and a few pairs of tongs constitute both "plant and equipment." Add to this, any "available" labor, and you're ready to treat your own *. . . Saving Time and Money in the bargain.*

More than one mine is today treating timbers with OSMOSALTS and obtaining, often from standing timber supplies on the property, dry, clean, odorless treated timbers which are safe to handle and fire retardant as well. Write today for all the facts.



Illustrated above are cross sections of three kinds of timbers. The white outer areas, which have been subjected to standard color reagent tests, show the deep penetration of the toxic chemicals in Osmosalts.

OSMOSALTS

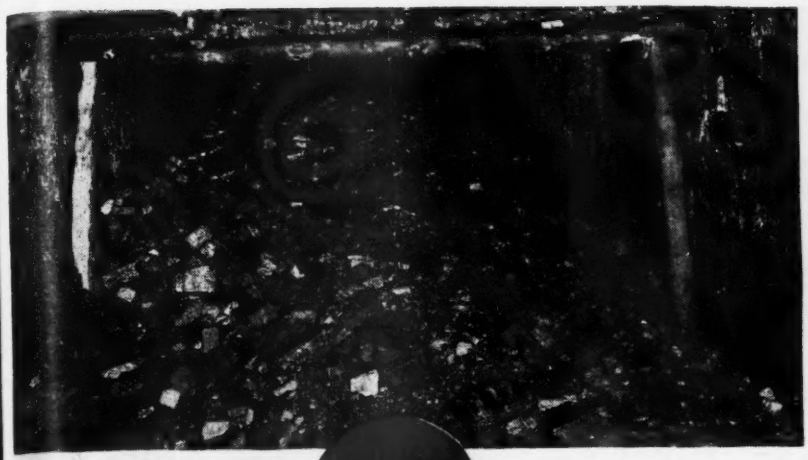
Nature's Method of Wood Preservation

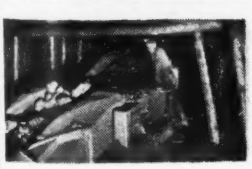
MANUFACTURED BY

OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.

GENERAL OFFICES: BUFFALO 12, N. Y.

BRANCH AND SALES OFFICES: BIRMINGHAM 3, ALA.; DENVER 2, COLO.; KENOVA, W. VA.; HARLAN, KY.; MT. VERNON, ILL.





AMERICAN
CYANAMID & CHEMICAL CORPORATION
EXPLOSIVES

Get the exact breakdown you want

The main objective in the shot pictured was tonnage production, the ultimate uses of the coal being by-product oven and steam purposes. Whatever your requirement, there remains this simple fact . . .

The right explosives get the right results . . .

In AMERICAN permissibles and electric blasting caps, products of intensive research, chemical control, thorough inspection and unremitting care in manufacture, the blasting agent fitted to your requirement can be found.

- ★ **HIGH EXPLOSIVES**
- ★ **PERMISSIBLES**
- ★ **BLASTING POWDER**
- ★ **BLASTING ACCESSORIES**

• *Capable field engineers are available at your call.*

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

EXPLOSIVES DEPARTMENT

SALES OFFICES: PITTSBURGH, Pa. Bluefield, West Va. Scranton, Pa. St. Louis, Mo. Chicago, Ill. Pottsville, Pa. Hazleton, Pa. Maynard, Mass.

YOU CAN'T stop fungous growths from flourishing in the humid temperature of the average mine. But you can stop them from decaying the wood in *your* mine by treating all ties and timbers with Chromated Zinc Chloride.

"CZC"-treated wood pays dividends in lowered maintenance costs, added safety and less frequent delays caused by replacements of ties and timbers. Write for facts on wood preservation for mines. E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware.

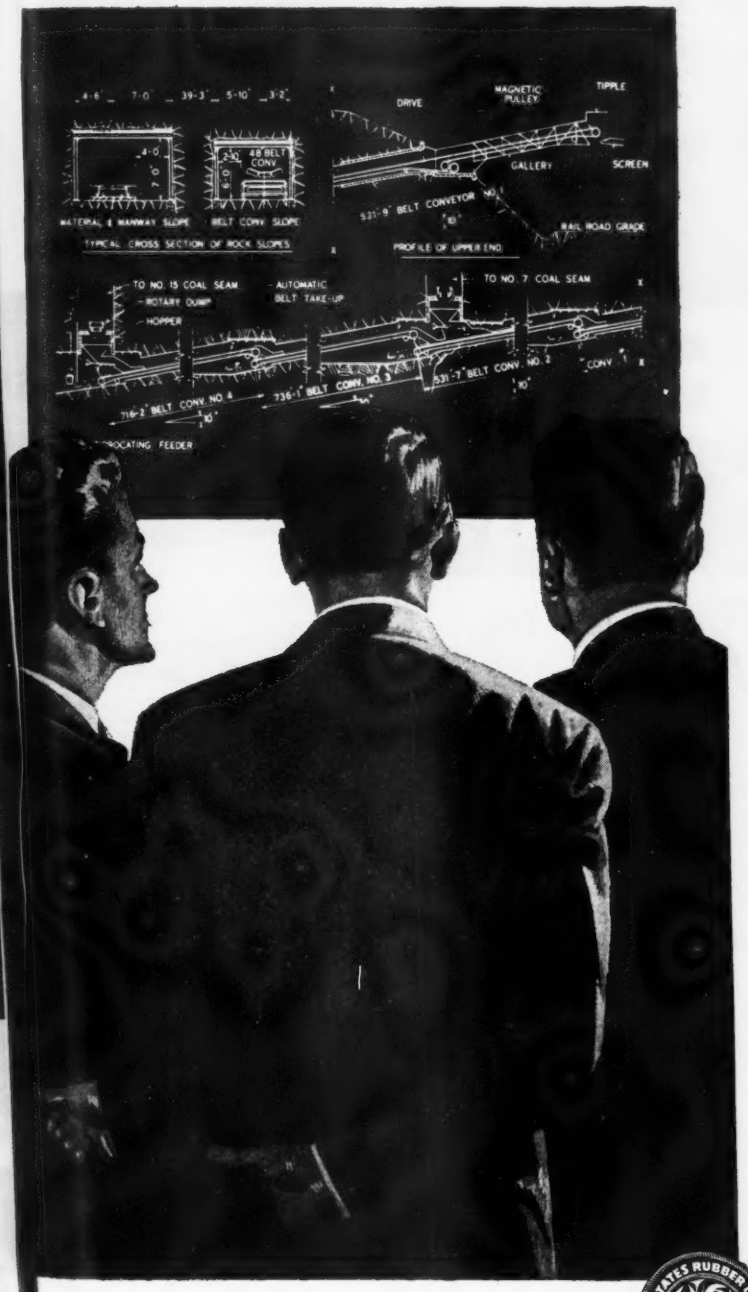
DU PONT CZC

(CHROMATED ZINC CHLORIDE)

WOOD PRESERVATIVE

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY



3 MEN AND A BELT

Three engineers — each representative of a separate technical staff — work together before a U.S. Conveyor Belt begins hauling its tonnage of materials.

If the installation is at a mine or quarry for example, these three are: the mining engineer, the conveyor equipment designer, and the rubber belting engineer.

Each contributes his part; each is necessary to the final performance of this important service in modern industry.

Because these three groups pool their experience, coordinate their skills and work as a team, materials are conveyed more efficiently today, on a volume production basis, than ever in the past.

ENGINEERED RUBBER CONVEYOR BELTS

SERVING THROUGH SCIENCE

THE MINING ENGINEER plans and blueprints the property to be worked. He is responsible for all operations, and with his staff must determine where, how and in what quantities the product can be economically moved.

THE EQUIPMENT DESIGNER recommends, provides and installs the mechanical equipment needed to operate an efficient conveyor system. On his specifications depend the size and strength of conveyor belt, or belts to be used.

THE RUBBER BELTING ENGINEER combines many skills — basic knowledge of rubber compounding . . . thorough understanding of fabrics . engineering techniques necessary to design and fabricate the proper conveyor belt for each job.

Listen to the Philharmonic-Symphony program over the CBS network Sunday afternoon, 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.

UNITED STATES RUBBER COMPANY

1230 Sixth Avenue • Rockefeller Center • New York 20, N.Y.

CHARGE ONE WHILE THE OTHER WORKS

Thousands of battery industrial trucks are working 24 hours a day handling materials in war plants. As a rule, one battery operates a truck for 8 to 12 hours, then is exchanged for another that has been charged meantime. Thus, except for the two or three minutes needed to exchange batteries, the truck need not stop work for servicing of its power unit.

A battery industrial truck has electric-motor drive, which means quiet operation, freedom from vibration and fumes, and a minimum of wearing parts. It starts instantly yet consumes no power during stops. It uses low-cost electric power. Altogether, it is one of the most dependable and economical types of handling equipment, especially in 24-hour-a-day operation.

It is extra dependable and extra economical when powered by Edison Alkaline batteries. With steel cell construction, a solution that is a natural preservative of steel, and a fool-proof principle of operation, they are the most durable, longest lived, and most trouble-free of all types of storage batteries. *Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, New Jersey.*

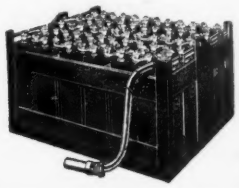
Edison
ALKALINE BATTERIES

GETS FOUR "NEW" BATTERIES FREE

A Typical Illustration of Alkaline Battery Dependability

The electrician of an industrial plant needed a standby power battery. Instead of buying one, he assembled one from cells of industrial-truck batteries that were being replaced. Their capacity, no longer sufficient for truck duty, was ample for the relatively light demands of the standby job.

That was around the start of the war. The "new" battery was so satisfactory that he has since made up others; he now has four supplying standby power for auto calls, emergency lights, clocks, etc., all from cells of batteries that had delivered eight years' service or more in industrial trucks.



Changing the punch on the ram of a press is a job that is being simplified by the use of the fork-lift type of truck in the manner illustrated here. Articles describing new developments in handling methods appear regularly in our publication, STORAGE BATTERY POWER. Write for a sample copy if you do not already receive it.

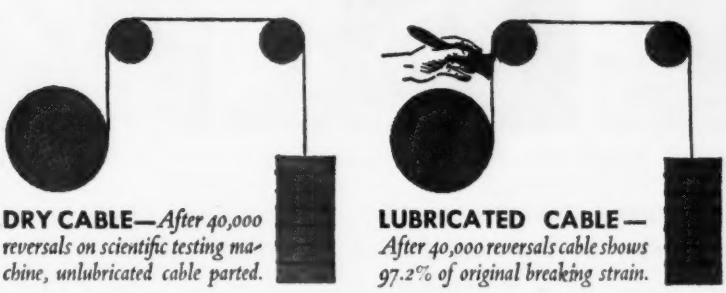
Spare the grease — and Spoil the Cable!

Today, with conservation of wire rope a vital necessity, every effort should be made to prolong the useful life of equipment you now have on hand. There is no wire rope available to private industry . . . only for government service and high priority war production.

As a safeguard against premature rope failure, proper lubrication is essential, inexpensive prevention that pays big dividends in man hours and money saved.

Wire rope is a mechanism with thousands of bearings in every foot—*metal surfaces moving against metal.* Regular and proper lubrication prevents corrosion, reduces wear, maintains safety and operating efficiency. Neglect or improper lubrication accounts for a high percentage of premature rope failure.

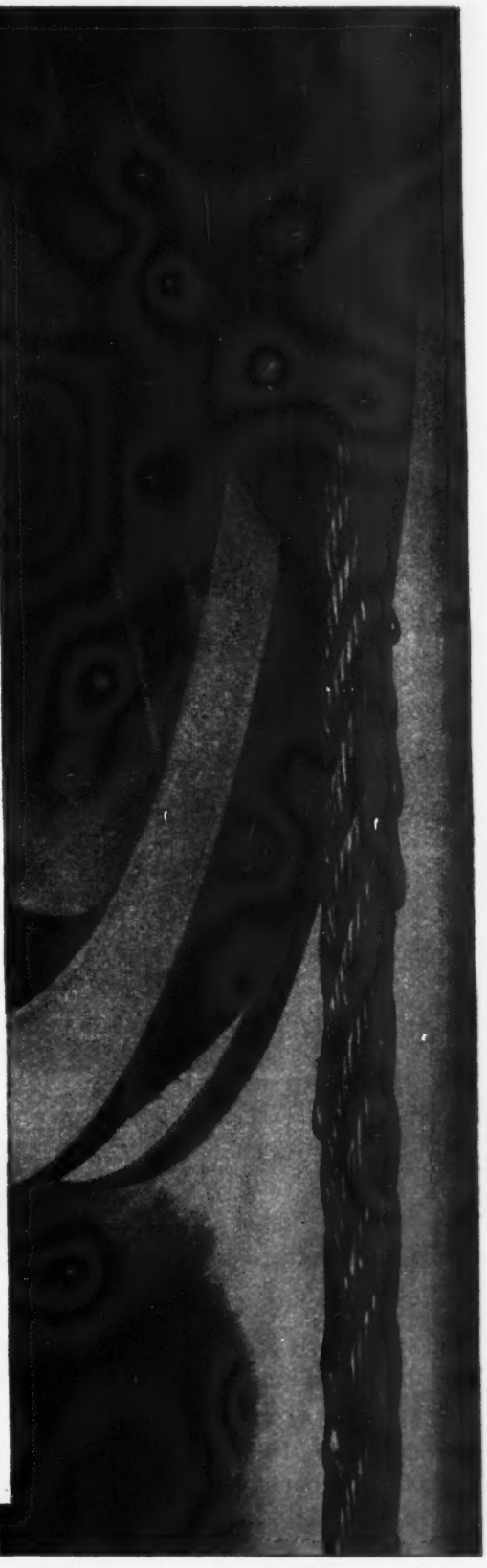
Proper Lubrication Can Increase Rope Life as Much as 500%



DRY CABLE—*After 40,000 reversals on scientific testing machine, unlubricated cable parted.*

LUBRICATED CABLE—*After 40,000 reversals cable shows 97.2% of original breaking strain.*

For advice regarding your specific problems, address our engineering department.



ROCHESTER *Ropes*

JAMAICA, NEW YORK • CULPEPER, VIRGINIA

WIDE, EASY LOADING BODY . . .

If you have idle construction equipment, make it available for home front use, where it is urgently needed. Register all your idle equipment with the local office of the War Production Board.

Wide body top opening permits full, heaping loads, assures easy and quick spotting of shovel dipper. Heaping loads every trip increase production. Short wheel base and three shuttle speeds make it easy to maneuver in tight spots, close to the loading unit. That, combined with the wide body top opening, cuts shovel swing time for more dipper passes per hour. Seconds are saved with every move . . . you get more loads per hour with Koehring Dumptors.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN

ARMY E NAVY

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

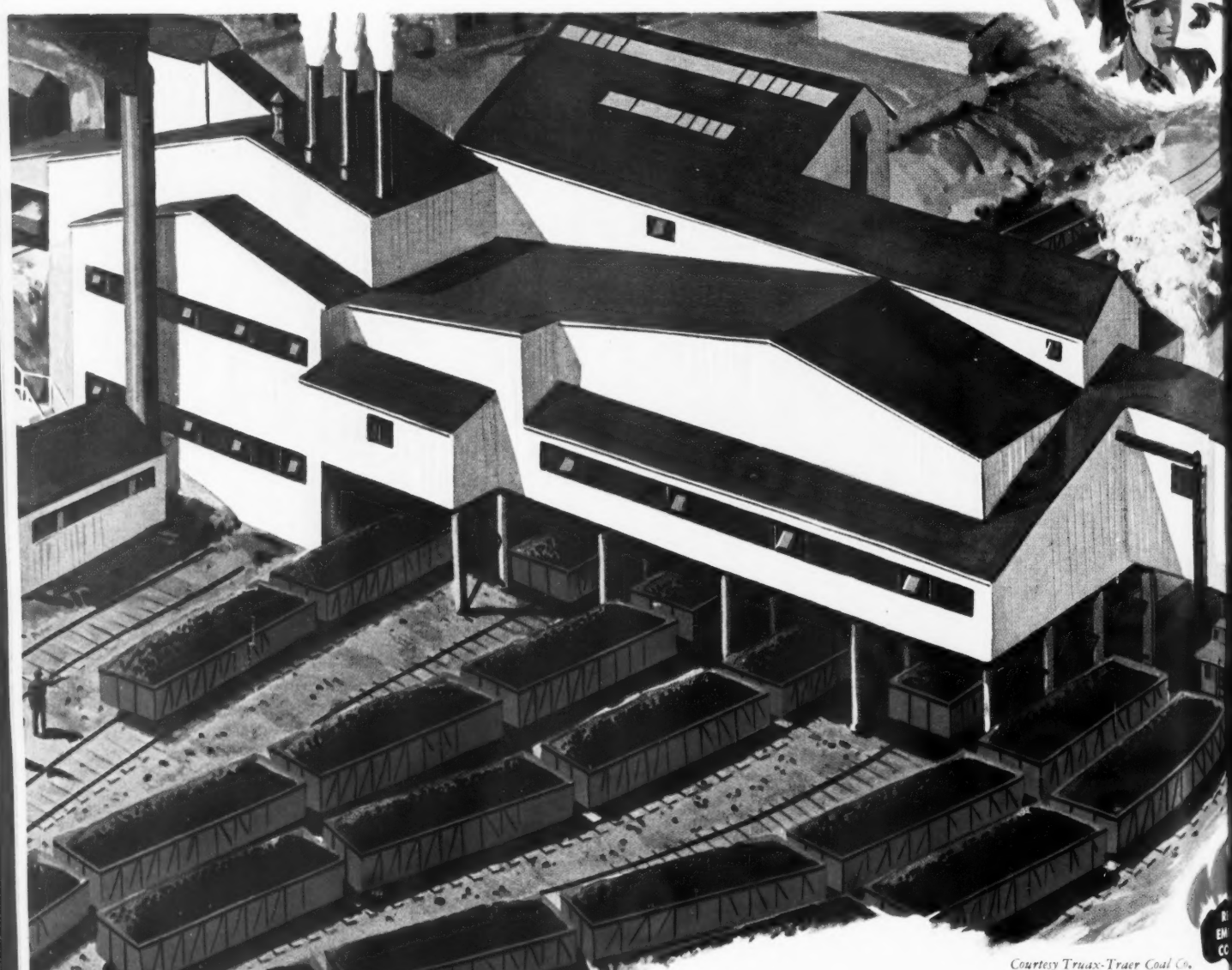
. . . signs of Prosperity at Coal Mines

(1) ***The Sign "Work Tomorrow"*** . . . (2) three blasts on the whistle . . . and (3) the coal preparation plant itself are signs of a profitable operation and steady work, welcome to management and men. At Red Ember Mine they have been signs of prosperity every day for nearly a decade.

But that was not always so! Owners of the mine knew of coal users all around them who did *not* use Red Ember coal because it was too high in ash content. In 1936 they put in a raw coal plant in which mechanical preparation replaced hand picking. The orders increased at once . . . the tonnage jumped 48% that year. Based on this increase, management was encouraged to add substantially to the plant by installing washing and drying equipment which further improved the product.

Washing and drying reduced ash content 50% . . . an improvement impossible without this processing . . . and coal production increased 39%. And all these improvements in product were accomplished at a preparation cost of only a few cents per ton. Today, the annual tonnage has increased to over 1¼ million tons of washed and dried coal, earning for Red Ember first place in its field.

If you are thinking about your markets after the war . . . how to get in and stay in at a profit . . . we can help you. Our technical staff is available for consultation with coal producers anywhere in the world and without obligation.

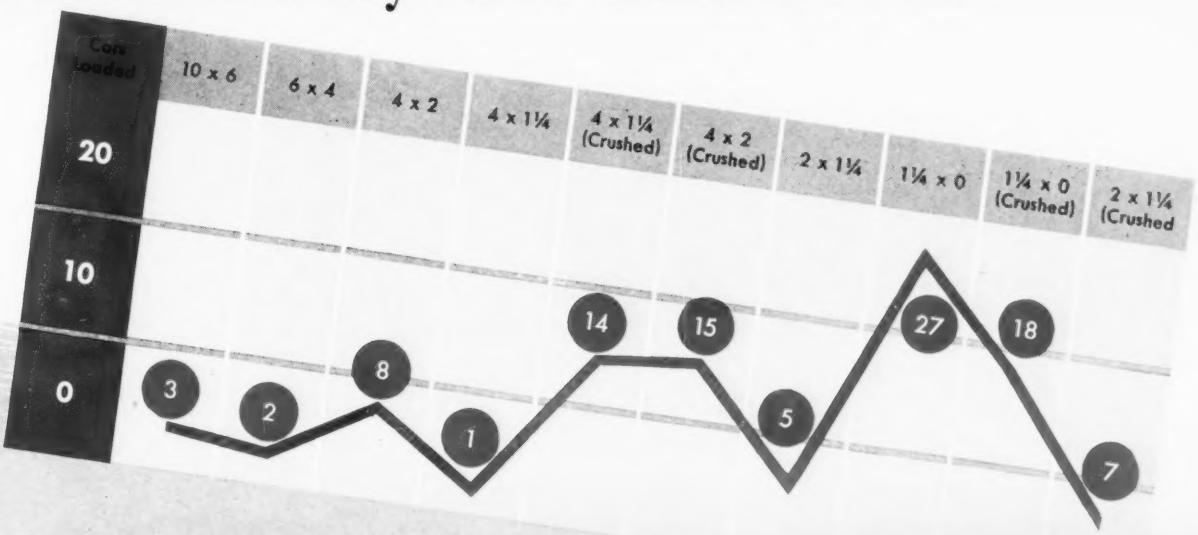


Courtesy Truax-Traer Coal Co.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUE

100 Carloads a day in 10 Classifications



with this flexibility you have more than a Tipple

Look at the breakdown chart of 100 cars of prepared coal that rolled out of the Fiatt Mine in one day! Ten classifications—from 10x6 to 1¼x0 . . . tribute to the flexibility of the preparation equipment for maintaining heavy production schedules.

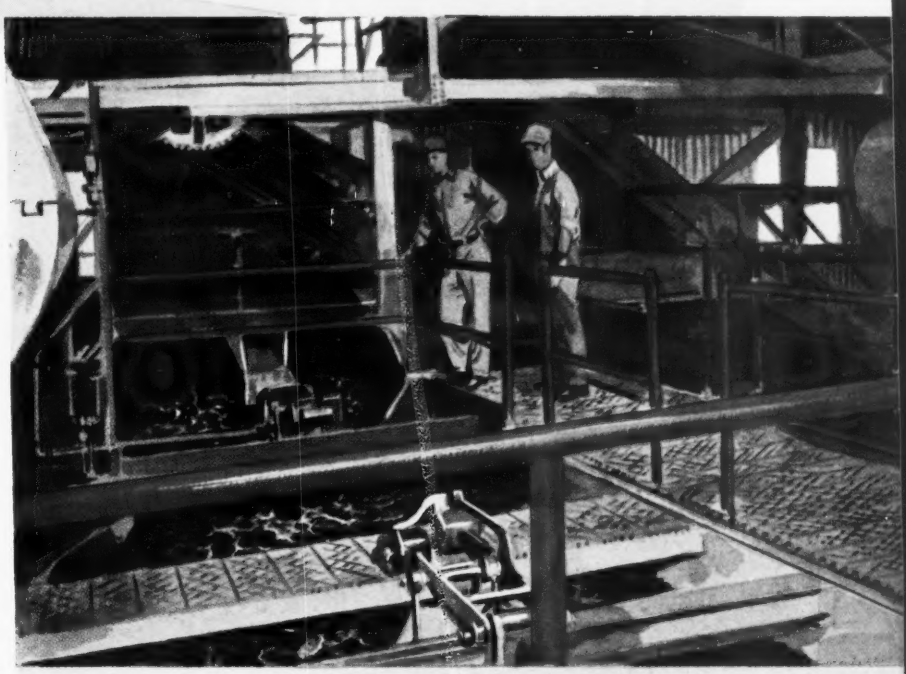
The superintendent has his schedule for the day. Raw coal entering the plant is manipulated mechanically by dropping unwanted sizes and diverting them to crushers and then to screens for resizing to meet the day's orders.

Impurities are washed away in McNally-Norton wash boxes. The agility of the wash boxes and quick control of the flow of coal to special crushing units make it possible to convert the washed coal rapidly into wanted sizes.

As the day progresses, the preparation superintendent knows how he is meeting his schedule. Even the dirtiest coal is cleaned and converted into specification coal in the right proportion of sizes, and this kind of coal brings premium prices.

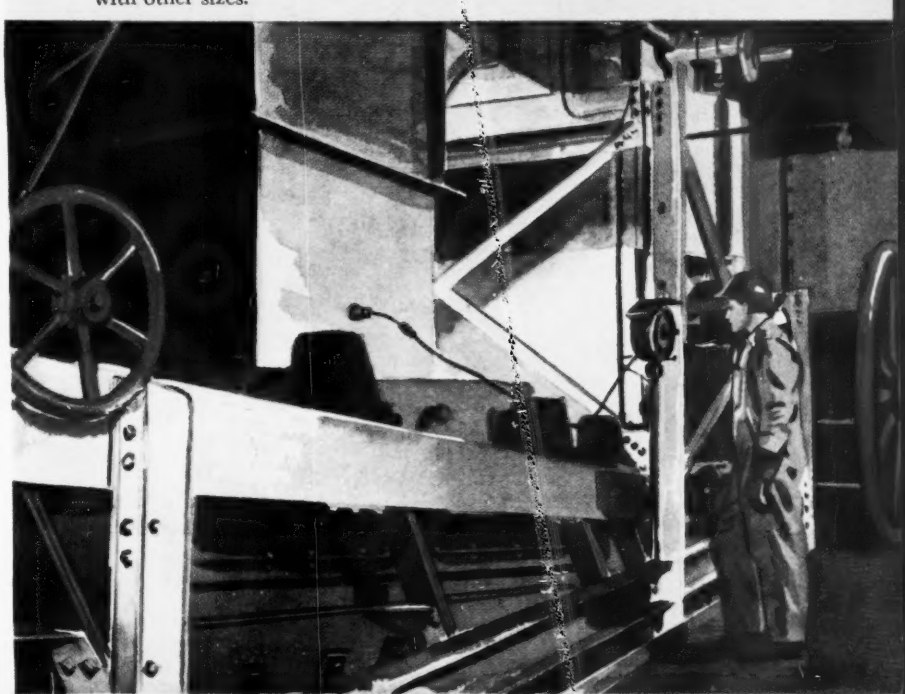
Our technical staff has had experience in solving coal preparation problems in every bituminous area from Alaska to South America. They are available for consultation on short notice.

To the left is a reproduction of advertisement number 4 in our series in Fortune Magazine.



● View across washer section where a series of 2 McNally-Norton washers wash all coal 6 x 0. Larger sizes are not washed; they are loaded direct after hand picking or crushed and reclassified for blending.

● Lower illustration is of the 3 McNally Vissac Dryers. Fine coals and screenings down to 0 are dried and loaded direct as stoker coal or blended with other sizes.



McNally Pittsburg Manufacturing Corporation, Pittsburg, Kans. • Chicago1, Illinois • Pittsburgh 19, Pa. • Caixa Postal 1310, Rio De Janeiro, Brazil

All over the Home Front

ON REPAIR AND MAINTENANCE WORK

P&H HARMOMANG

A Proved Electrode For *high* Resistance to Impact, Abrasion and Wear

Harmomang is an electrode with the work-hardening qualities which suit it especially for the building up or hard surfacing of manganese and carbon steels.

It is a coated moly-manganese electrode with a hardness range up to 43-46 Rockwell "C". It can be used on AC, or for either straight or reverse polarity on DC.

Harmomang is the ideal electrode to use wherever you need protection against both impact and abrasion. For example: for hard surfacing dipper lips, dipper teeth, buck runners, rock crushers, railway frogs wherever longer life is desired for par made of manganese or carbon steels.

Write direct for full information an procedures or see your P&H represe tative.

A COMPLETE ARC WELDING SERVICE

60 YEARS OF SERVICE 1884-1944

P&H Alloy ELECTRODES

General Offices:
4540 W. National Ave., Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

WELDING ELECTRODES · MOTORS · HOISTS · P&H · ELECTRIC CRANES · ARC WELDERS · EXCAVATORS

Canadian Distribution: The Canadian Fairbanks-Morse Co., Ltd.

with anthracite's most Powerful Electric Hoist

... 93 trips per hour to surface 420 tons of coal—*that's real production!* And that's the everyday record for this Westinghouse powered and controlled mine hoist—the most powerful in the anthracite field.

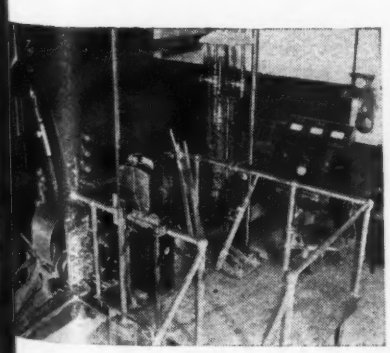
It takes a lot of horsepower to do a job like this—1750 in fact—supplied by this powerful pedestal-type, wound-rotor Westinghouse induction motor. Operating on 2200-volt, 3-phase, 25 cycle power, the motor drives a large gear unit, connected to a conical drum carrying the 1700 ft. of 1⅝" steel cable used to raise and lower the cages.

This hoist replaces an old 30 x 60 steam unit—and provides faster and more economical hoisting.

Conditions surrounding this installation were such that the purchase of low-cost, highly efficient alternating current equipment was recommended by Westinghouse engineers after a study of the requirements.

This is just another example of the ability of Westinghouse to solve the toughest mining problems. For a simple solution to your complex electrical problems, call your nearest Westinghouse Office. Westinghouse Electric & Mfg. Co., P.O. Box 868, Pittsburgh 30, Pa.

J-94643



CONTROL STATION—Primary hoist control is furnished by electro-pneumatically operated contactors. Secondary control gives 10-point acceleration through adjustable relays of the definite time-limit inductive type, operating on the last seven contactors. The first three points are under manual control. An electro-pneumatically operated air-brake contactor provides for reversal on the 2200-volt circuit.

This 90-page booklet gives complete information on how to select electric hoist equipment to meet your special requirements. Write for free copy of B-3055 today.

Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

ELECTRICAL EQUIPMENT FOR THE MINING INDUSTRY

ARMAMENTS—*in the Raw*

THE MINING industry of America is moving the raw materials of Victory out of the good earth and into action. Here is the raw beginning of tanks and ships, planes and guns.

Powerful International Trucks help speed mining's colossal part in the war—moving ore for weapons, coal for power.

In the hard-coal country, mountainous dumps of waste, generations-old, are being reworked, sometimes with as high as 80 per cent salvage. International Trucks are moving these mountains to the collieries, day and night, for their tremendous yield of rediscovered coal.

In the strip and deep-mine areas—where such fighting metals as iron, lead and zinc are literally chewed out of the earth—Internationals take their 20-ton loads from gigantic power shovels, over makeshift roads, putting America's raw materials into the fight.

These Internationals are rugged trucks. They're brothers under the hood to the International Half-Tracks that are fighting on foreign fronts, powered with the same famous International Red Diamond engine.

The stamina and dependability these Internationals are demonstrating in the mining industry explain why—in the ten years before the war—more heavy-duty International Trucks were sold than any other make.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Ave., Chicago 1, Ill.

INTERNATIONAL

NEW TRUCKS—NOW!

The government has authorized the manufacture of a limited quantity of trucks for essential civilian hauling. International is building them in medium-duty and heavy-duty sizes. See your International Dealer or Branch now, and get valuable help in making out your application. Don't delay!

Pledged U.S. TRUCK CONSERVATION CORPS

BACK THE ATTACK—BUY WAR BONDS!

INTERNATIONAL *Trucks*

CARDOX

(NON-EXPLOSIVE MINING METHOD)

Protects Property as well as Profits

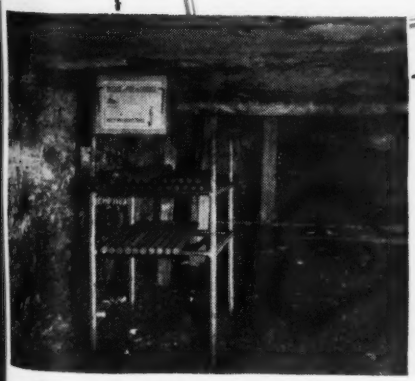
IN CASE OF FIRE USE CARDOX

1. SECURE WRENCH FROM MOTORMAN OR CARDOX RACK.
2. INSERT WRENCH IN SHELL AS SHOWN AT LEFT.
3. OPEN VALVE BY STRIKING WRENCH WITH PALM OF HAND.
4. POINT VALVE AT FIRE. ALLOW TO FLOW ONTO BLAZE AS SHOWN AT RIGHT.
5. THROW SHELL INTO FIRE IF IT CANNOT BE APPROACHED.
6. USE AS MANY SHELLS AS NECESSARY.

IMPORTANT:

1. NOTIFY FOREMAN AT ONCE!
2. DO NOT ALLOW SHELL TO TOUCH ELECTRIC WIRES!
3. RETURN KEYS TO MOTORMAN OR CARDOX RACK!

HELP PREVENT FIRES



You will find this placard posted in mines using the CARDOX Mining Method.

CARDOX
HARDSOCG DRILLING EQUIPMENT
Complete line of drilling equipment designed to give you the maximum in drilling efficiency.

● Increased tonnage is only one of many advantages the CARDOX Non-Explosive Mining Method provides. For example, its use removes many of the causes of mine fires; and the availability of CARDOX tubes as emergency fire extinguishers makes it possible to check potentially serious coal and electrical fires at their inception.

The card reproduced here shows how to get quick and effective fire fighting action with CARDOX tubes. The carbon dioxide released spreads rapidly and uniformly... even against a strong draft. It penetrates where water or rock dust cannot reach, does not wet or otherwise damage any material or machinery, and is amazingly effective in smothering and cooling out stubborn fires.

A free test in your own mine will prove the effectiveness of CARDOX in stepping up production, while decreasing roof and rib hazards, dust and gas explosions, and fire damage.

CARDOX CORPORATION

BELL BUILDING CHICAGO 1, ILLINOIS

GLASSKLAD BATTERIES

One of a series of imformative articles for users of industrial batteries

To assure 100% of capacity throughout the rated life of the Kathanode battery Gould has perfected three important improvements in the design of the positive plate unit.

First is Black Oxide, the unique active material with the pure lead core. As normal cycling operations wear away the outer surface of this active material it exposes some of the pure lead which, in turn, is converted to lead peroxide to maintain a constant volume of active material in the plate.

Second is the Kathanode Grid with its principal members cast in a double-wedge shape that securely locks the active material in each box-like pocket. Extra strength and conductivity is provided by a round central member of smaller cross-section buried in the active material of each pocket, where it is safe from the attack of peroxidization.

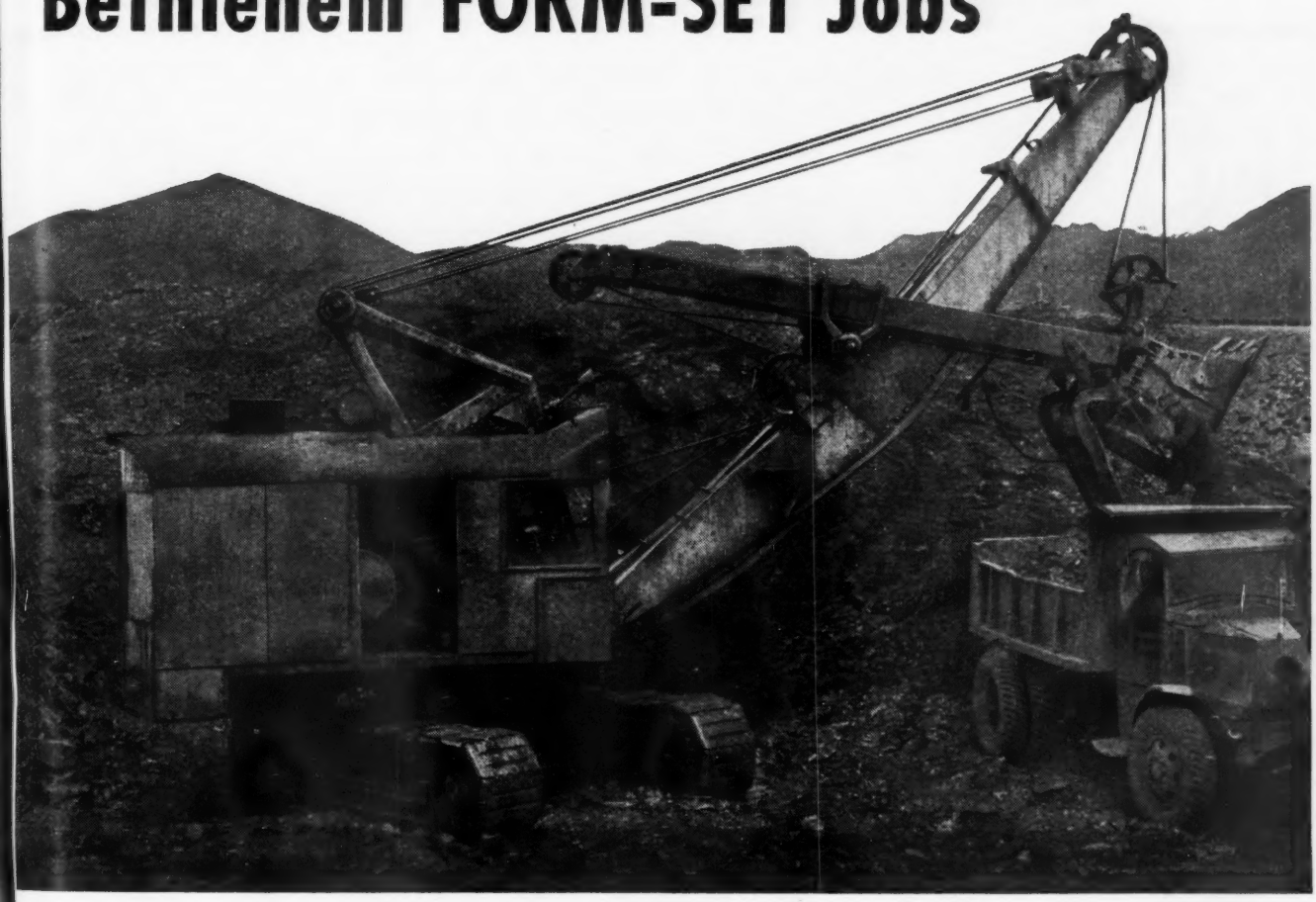
Third are the spun glass mats which Gould pioneered for American battery users. They are placed on both sides of the positive plate to prevent any active material, which might dislodge, from losing contact with the plate. In this sense they act as a retainer. However, when active material becomes inert and frees itself from the positive plate, it is much smaller in size. It can then filter through the porous mats to the sediment chamber.

Some interesting facts about the Gould spun glass mat are found upon examination of the product. Each filament of glass is drawn to a diameter of only .0008 of an inch. There are twelve layers of these threads, even though the porosity of the mat exceeds 90%, and uniformity is maintained by the use of a weight system to check each mat.

You will also note that these mats are made with long, continuous threads of glass fiber, instead of short pieces. This permits capillary action and promotes rapid diffusion of fresh electrolyte to the plate surface, an important factor in maintaining sustained voltage during discharge.

Thus, in Gould Kathanode construction, you get a special long life active material, a grid to match active material life, and spun glass mats that minimize shedding, while still permitting free circulation of the electrolyte, throughout the battery's many years of service life.

Stripping and Loading are Bethlehem FORM-SET Jobs



According to recent figures, strip mines in this country are capable of producing some 225,000 tons of coal daily. Much of the work is being done by huge power shovels and draglines. But the little fellows are doing a great job too!

In many areas where it wouldn't pay to install the big machines, plenty of coal is being uncovered with small shovels and "drags"—outfits in the 2- to 6-yd. class. And many of these machines are equipped with Bethlehem's Form-Set (preformed) rope, for service like this demands a rope that stands up against wear and is highly resistant to bending fatigue.

You'll also see a lot of Bethlehem Form-Set in the loading operations . . . where shovels and cranes both dig and load the coal. Here, too, the operating ropes frequently bend around short radii, and they need Form-Set's pliability. Since Form-Set is unusually free from internal stresses, it's easy to handle, and it naturally lasts longer.

All grades of Bethlehem Wire Rope can be supplied in the Form-Set construction. For stripping and loading work, your best bet is Form-Set in the Purple Strand grade. Purple Strand Form-Set is Bethlehem's top-quality preformed. It's tough, sinewy, strong . . . as gutty a rope as you'll find anywhere.

When you think WIRE ROPE . . . think BETHLEHEM

★ ★ ★ BETHLEHEM STEEL ★ ★ ★

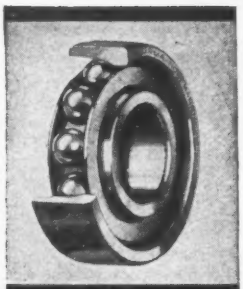
ON THE FIGHTING FRONTS!
ON THE PRODUCTION LINES!

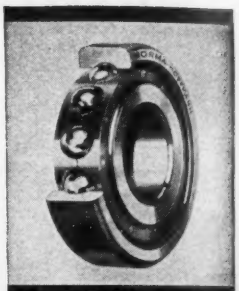
The PRECISION BEARINGS here pictured, together with many others from the comprehensive NORMA-HOFFMANN line, have literally "gone to war" for the Allied Nations.

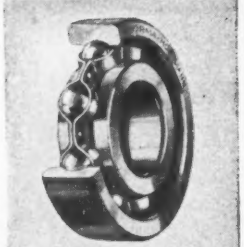
On the fighting fronts, they are "in the service" in every type of naval craft, from patrol boat to battleship—in bombers, fighters, scout planes, trainers and transports—in guns, tanks, mobile artillery, military transport and supply equipment.

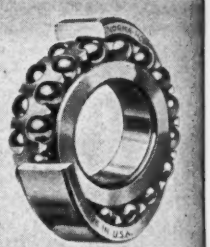
On the production lines, NORMA-HOFFMANN Bearings are in thousands of machines, machine tools, and other vital mill and shop equipment that are turning out ships, armament and indispensable war materials for the American and Allied forces.

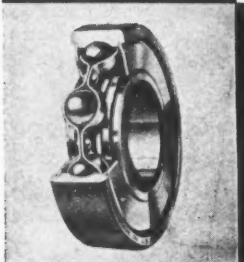
Let our engineers work with you.

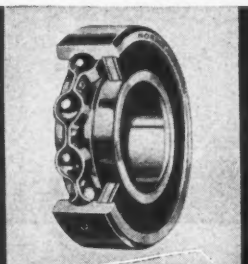

Separable (Magneto) Ball Bearing

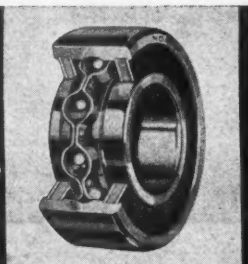

Litro ("CL") Composition Retainer Ball Bearing

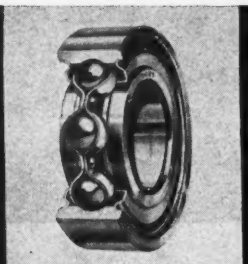

Single Row Ball Bearing

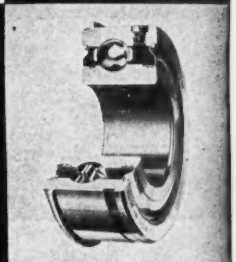

Double Row Self-Aligning Ball Bearing

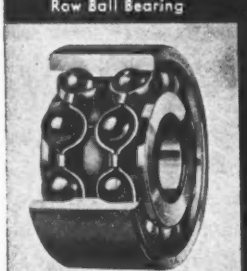

Shielded Type Single Row Ball Bearing

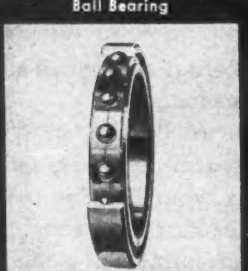

Single Felt Seal Ball Bearing


Double Felt Seal Ball Bearing

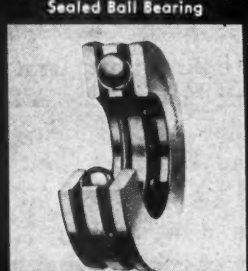

9000 Series (Feltless) Sealed Ball Bearing

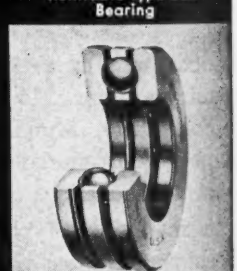

"Cartridge" Fully Sealed, Refillable Type Ball Bearing

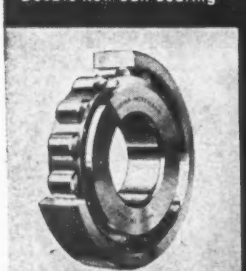

Double Row Ball Bearing

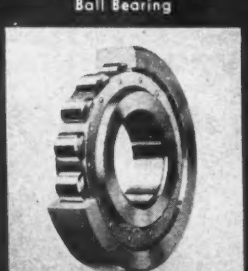

Extra Light Type Ball Bearing

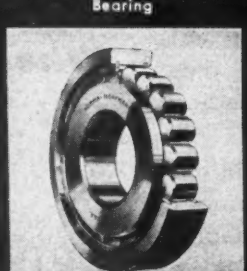

Angular Contact Ball Bearing


Extra Light Single Direction Ball Thrust Bearing

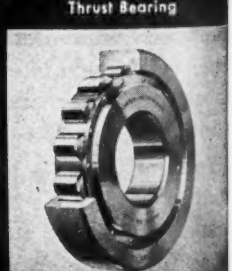

Single Direction Ball Thrust Bearing


Standard Cylindrical Roller Bearing


Type "E" Cylindrical Roller Bearing


Full Type (Retainerless) Cylindrical Roller Bearing


Extra Light Cylindrical Roller Bearing


Two-Lipped Cylindrical Roller Bearing

NORMA-HOFFMANN BEARINGS CORP'N, STAMFORD, CONN., U. S. A. • FOUNDED 1911

TO WIN THE WAR: Work—*Fight*—Buy War Savings Bonds

Tomorrow's Mines will *Modernize* Electrically

BETTER COMMUNICATION SYSTEMS AND PRODUCTION METHODS MEAN MORE COAL PER HOUR

As more and more mines go "mechanical", the importance of adequate signal and communication systems becomes more apparent.

It takes the full-time operation of high-speed electrical equipment to produce coal at minimum costs. Machine movement and production flows are so closely co-ordinated that it takes modern communication systems to link them up—and keep them traveling smoothly.

See your local communication and electrical company's engineers who will give you the latest information on electrical communication, signal and power installations. They have a keen knowledge of what's new in modern mining. They can especially help you in establishing modern communication systems . . . newer scraper hauler methods . . . better ventilation . . . better maintenance of line voltages . . . better preparation and improved pumping methods. WHY NOT GET THE FACTS!

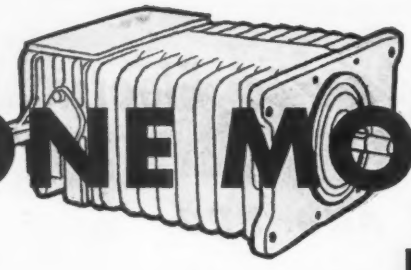
His suggestions may save you money today—and will become increasingly important after V-day. And when Victory releases the grip of restrictions, and you can go full speed ahead with your modernization plans, remember Roebling is the *wire* specialist—ready to provide the right conductor for *every* job.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

ROEBLING

PACEMAKER IN WIRE PRODUCTS

Wire Rope and Strand • Fittings • Cold Rolled Strip • High and Low Carbon Acid and Basic Open Hearth Steels • Aircord, Swaged Terminals and Assemblies • Round and Shaped Wire • Wire Cloth and Netting • Electrical Wires and Cables • Suspension Bridges and Cables Aerial Wire Rope Systems



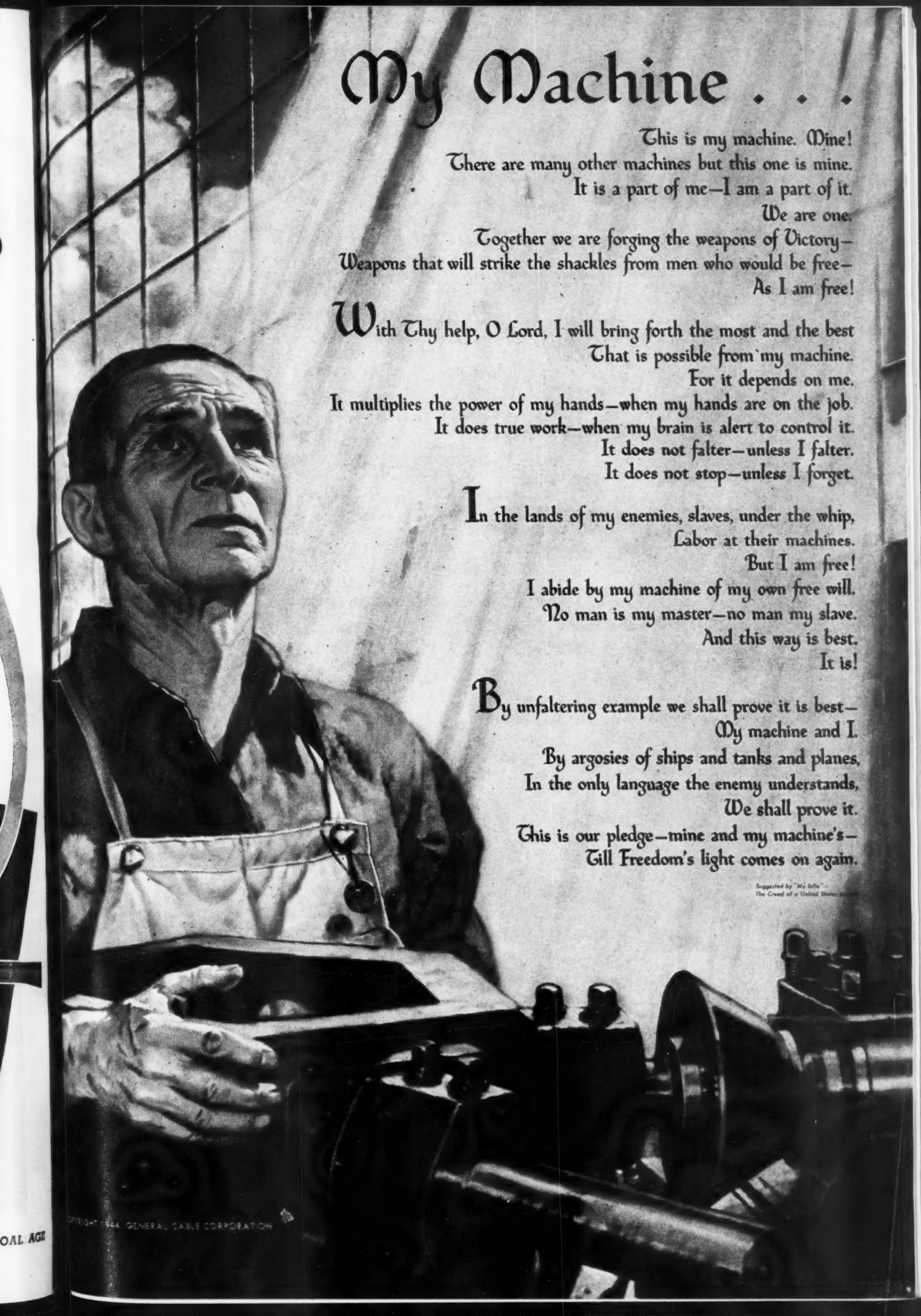
ONE MOTOR *does the whole* POWER JOB

Just one motor is required to power the CLARKSON LOADER—the *lowest* loading machine on wheels. Operator handles *all* controls from one central point. No other Loader offers such simplicity of operation and control, with such a wide range of application, employing *only one* 50 h. p. motor.

Get all the *facts* about the CLARKSON before you decide on *any* Loader.

The
CLARKSON
MANUFACTURING
COMPANY
NASHVILLE • ILLINOIS

(PATENTED)


My Machine . . .
This is my machine. Mine!
There are many other machines but this one is mine.
It is a part of me—I am a part of it.
We are one.
Together we are forging the weapons of Victory—
Weapons that will strike the shackles from men who would be free—
As I am free!
With Thy help, O Lord, I will bring forth the most and the best
That is possible from my machine.
For it depends on me.
It multiplies the power of my hands—when my hands are on the job.
It does true work—when my brain is alert to control it.
It does not falter—unless I falter.
It does not stop—unless I forget.
In the lands of my enemies, slaves, under the whip,
Labor at their machines.
But I am free!
I abide by my machine of my own free will.
No man is my master—no man my slave.
And this way is best.
It is!
By unfaltering example we shall prove it is best—
My machine and I.
By argosies of ships and tanks and planes,
In the only language the enemy understands,
We shall prove it.
This is our pledge—mine and my machine's—
Till Freedom's light comes on again.
Suggested by "My Rifle"—
The Creed of a United States
OPYRIGHT 1944 GENERAL CABLE CORPORATION

This war poster, the eighth of a series, is published as a tribute to the men and women in war plants from coast to coast who inspired the message.

GENERAL CABLE CORPORATION

If engaged in war work: larger bulletin board copies (25 x 35 inches) are available with our compliments. Write GENERAL CABLE CORPORATION, 420 Lexington Avenue, New York 17, N. Y.

Recommendations

A GLANCE AT THE "BREAKDOWN" below gives you a rough idea of the broad range of equipment A-C builds for coal producers and distributors. This "breakdown" is not complete, for A-C builds over 1600 *different* products — many of them widely used in this industry.

The significant fact is that A-C builds *all types* of basic processing equipment . . . many different styles and sizes. When you need a screen, for example, selection can be made—not from one—but *four different* styles. This means you get the *exact* equipment for your application. Yes, A-C recommendations *are* unbiased . . . because they're based on the job to be done—not an improvised way of doing it!

Next time *you* have a processing problem call on A-C. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 1739-C

POWER & ELECTRICAL	Power Plants	Turbines & Condensers Generators Boiler Feed & Condenser Pumps
	Distribution & Control	Transformers Voltage Regulators Unit Substations Switchgear Circuit Breakers Switchboards & Control
	ac/dc Conversion	Motor-Generator Sets Synchronous Converters Mercury Arc Rectifiers
MOTORS & CONTROL	Lo-Maintenance Motors	Squirrel Cage Wound Rotor Synchronous Direct Current
	Large Motors	A-C & D-C to 5,000 hp with Control
	Gearmotors	All-Motor or Integral—for Machine Mounting
	Motor Controls	Open or Enclosed Starters Combination Starters
TEXROPE V-BELT DRIVE PRODUCTS	Sheaves	Constant Speed Variable Speed
	Speed-Changer Units	Manual or Motor-Operated
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Save MAINTENANCE TIME

THE *Iron Valve* WITH *Bronze* WHERE IT'S NEEDED

If you want to reduce valve maintenance time on lines where frequent cleaning and inspection are required — specify Walworth Fig. 709, the bronze-mounted Iron Body Saddle Style Wedge Gate Valve.

Easy to take apart because of its U-bolt body-to-bonnet connection, this valve permits quick inspection, easier cleaning, and rapid re-assembly, and can be re-packed under pressure in either the open or closed position. It is recommended for general use on steam, gas, gasoline, water, oil, and process lines, and is especially suited for lines carrying sludge, fluids of high viscosity, or mixtures which might have a tendency to clog under the disc or between the valve seats.

Walworth Fig. 709 is made with bronze wedge, seat rings, stuffing nut, gland, bonnet bushing, stem and stem nut. The bonnet and body are made of cast iron. Two drain holes located inside the bonnet permit the line fluid to drain off when the valve is open, thus eliminating the danger of serious damage due to freezing. This valve is furnished with either screwed or flanged ends, in sizes from ¼" to 4".

All Iron Valve

For services where line fluids are corrosive to bronze trim, Walworth offers Fig. 711, an iron body valve which has malleable iron wedge disc and stuffing nut and steel gland and rising stem. This valve is available in sizes from ¼" to 4" (Screwed), and 1" to 4" (Flanged).

For further information on these Walworth Valves — and details on Walworth's complete line of valves and fittings — write on your company letterhead for a free copy of Catalog 42.

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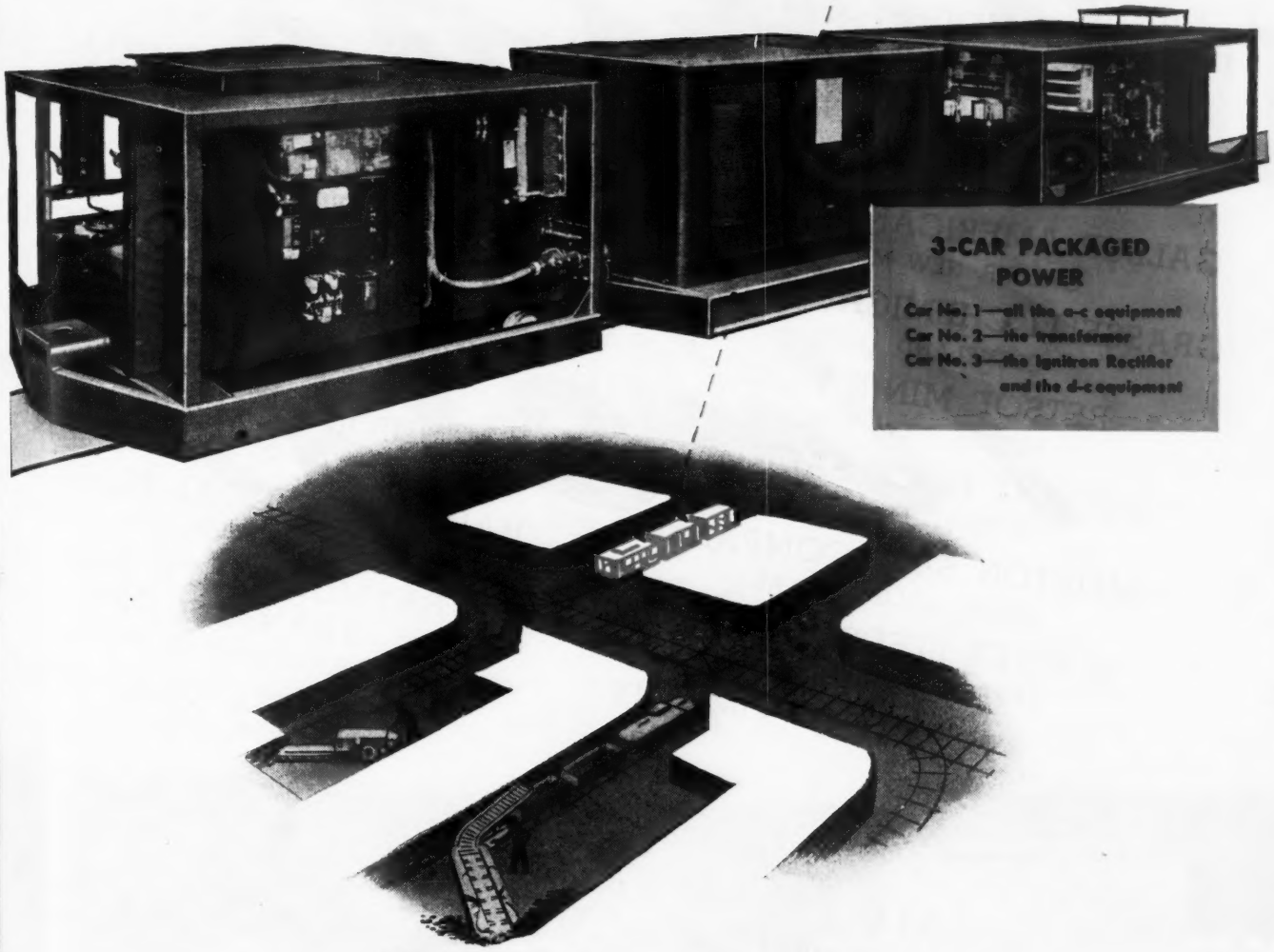
. . . an exclusive Westinghouse development, the Ignitron Rectifier train actually provides a power substation near the face. The modern, light, compact Type ASL Air-cooled Transformer, built into this equipment, contains no inflammable or toxic liquids to leak or cause damage. Inerteen type transformer, if desired. Choice of pumped or sealed-tube Ignitron.

. . . the extreme flexibility, rugged construction and economy of operation has resulted in widespread acceptance of this equipment by the coal mining industry—units are in service in all of the important coal producing areas. Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., Dept. 7-N.

J-94630



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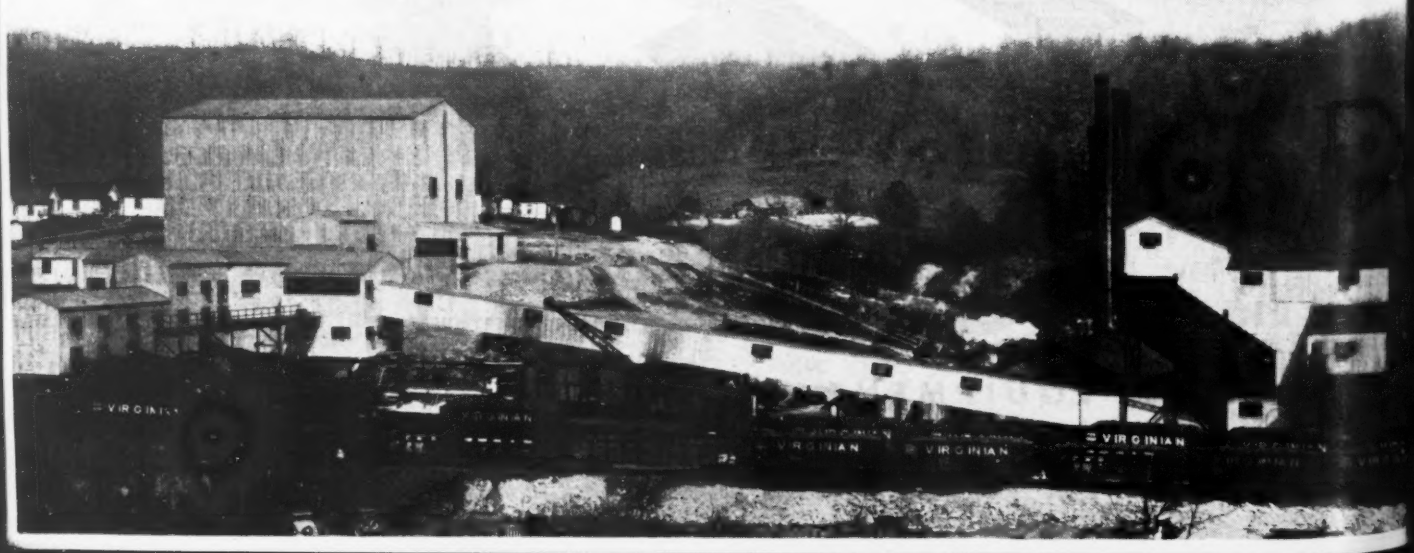

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"Monobel" AA is a strong, low-velocity, water-resistant ammonia permissible with excellent fumes. Its slow, heaving action moves the coal forward from the working face to help speed up mechanical loading operations. And it produces large, firm lump that stands up well in transportation.

If you are mining wet or hard-shooting coal—be sure to look into the new features of "Monobel" AA. Any Du Pont Explosives Representative will be glad to give you full details. Or, write to E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

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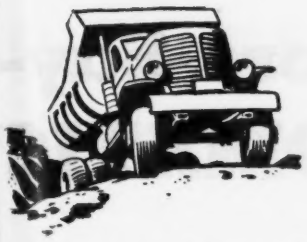
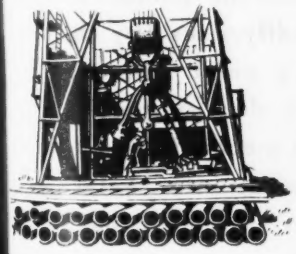


For the new dump trucks, shovels, compressors, locomotives, or the various other heavy-duty construction and material handling equipment you are planning to buy, specify Cummins Diesel power. Practically all of the leading manufacturers offer this diesel as optional equipment.

In the Northwest Woods, Cummins Diesels do the complete job—from show to siding. They power yarders, loaders and tugs ...trucks that handle up to 240,000 pounds (three carloads). In this service, Cummins Diesels are the symbol for "cheap logs."

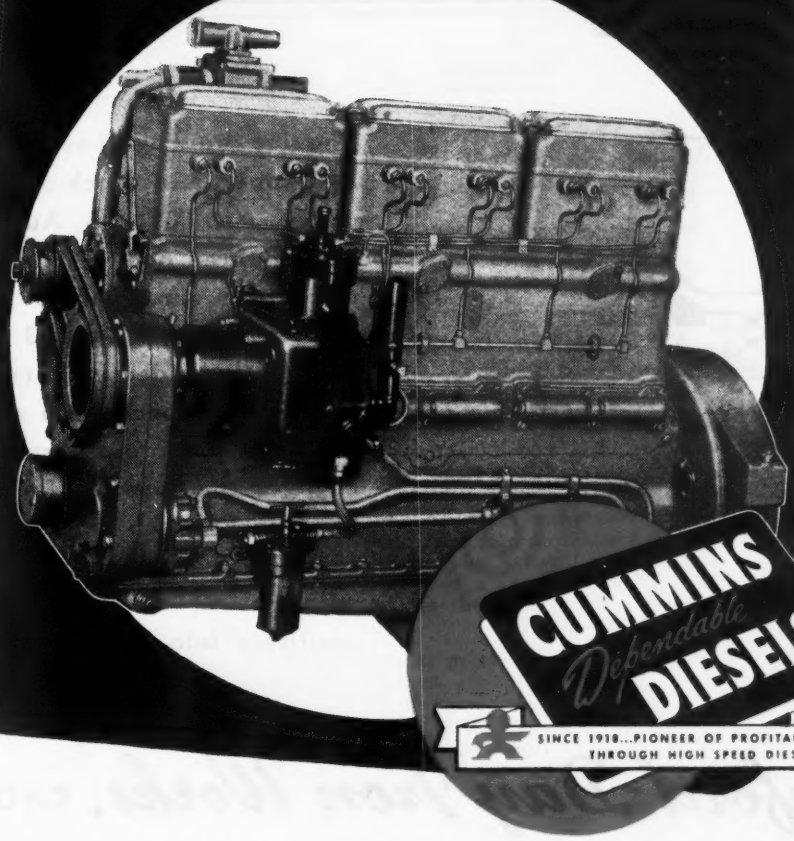
In the commercial fishing fleets of the Pacific, Atlantic and Gulf coasts, and in all types of work boats and pleasure craft, Cummins Marine Diesels—propulsion engines and generating sets alike—have become a byword for dependable, low-cost performance.



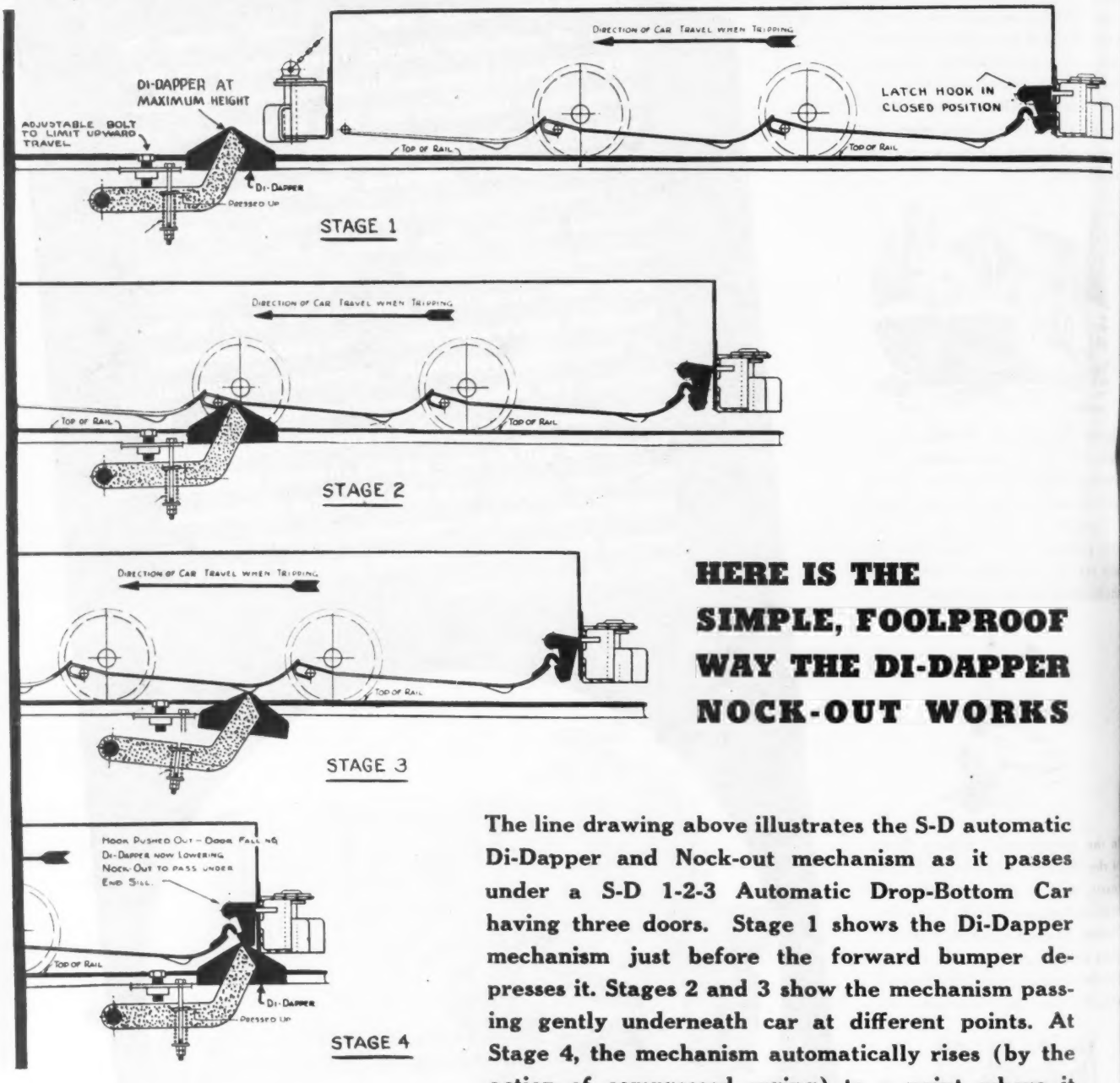
In the vast Mid-Continent area, the world's greatest oil producing territory, Cummins Dependable Diesels power more rotary and cable tool drilling rigs and oil well service units than any other make of diesel engine.

Step by Step

Tremendous weight and size greatly limited the uses of early-day diesels. Twenty-six years ago, the builders of Cummins Diesels decided to do something about that—and did! Step by step, and with *each step first tested and proved on the job*, they simplified design . . . improved construction processes . . . turned to lighter, stronger materials . . . steadily boosted the rpm. That, briefly, is the story of the modern Cummins Diesel . . . the *original high speed diesel* that, since 1932, has won its spurs on the toughest, heavy-duty jobs . . . in virtually all types of heavy-duty equipment, automotive, industrial, marine. For tomorrow, continued refinements in diesel manufacture promise a Cummins Dependable Diesel that will do your job still cheaper, still faster, still longer. So plan now to standardize on Cummins Diesel power for the equipment you will build or operate after the war. CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.



★ Operators Say—"Y
Made the S-D 1-2-3 "AUTOMATIC" th



HERE IS THE SIMPLE, FOOLPROOF WAY THE DI-DAPPER NOCK-OUT WORKS

The line drawing above illustrates the S-D automatic Di-Dapper and Nock-out mechanism as it passes under a S-D 1-2-3 Automatic Drop-Bottom Car having three doors. Stage 1 shows the Di-Dapper mechanism just before the forward bumper depresses it. Stages 2 and 3 show the mechanism passing gently underneath car at different points. At Stage 4, the mechanism automatically rises (by the action of compressed spring) to a point where it engages the forward faces of the door-supporting latch hooks. Each car has two such mechanisms, and each mechanism automatically comes into contact with one of the latch hooks and forces it back positively into its unlatched position.

Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

"Your DI-DAPPER NOCKOUT Has the Perfect Drop Bottom Mine Car!"

• We, at Sanford-Day, still feel that the way to help coal mine operators is to keep ahead with improvements in mine cars that save time and money. Now that our Di-Dapper Nock-out device has been perfected—as well as our new frame construction and wheel designs—we confess that we don't know what more we can do to increase the value of our S-D Automatic Mine Car. No mine car in the world, we think, can give you as low production cost.

Our new Nock-out unlatching device for Drop-Bottom ine cars is made to operate either mechanically or lectrically. According to Earl Griffith, Manager of the ruden Coal & Coke Co., of Pruden, Tennessee, and the n of Charlie Griffith, who invented the first practical esign of Drop-Bottom mine car which we manufactured 7 years ago, the Nock-out is the greatest improvement nce Griffith's original Drop-Bottom cars were invented. Write us, and we will tell you where you can see them operation. Pruden got the first 100 cars in August, 942. One of the largest of coal operators, who uses D "Automatics" with great satisfaction and great vings in more than 5 mines, recently said that he ouldn't consider using anything else from now on except Drop-Bottom car which ca be unlatched by a practical lock-out unlatching device. We have just this sort of echanism—tested and proved.

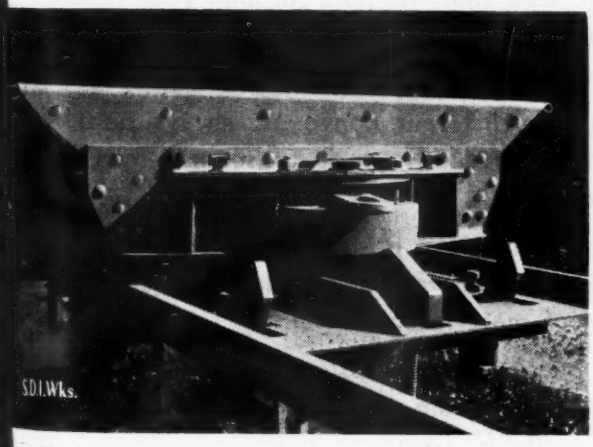
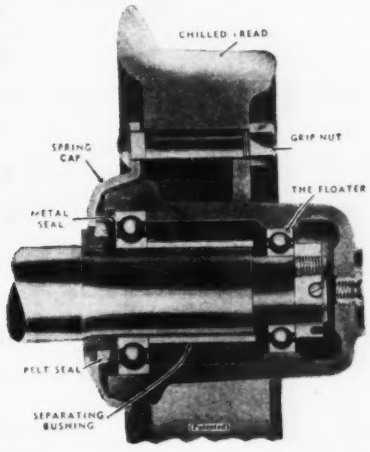


Photo above shows car just after it has passed over Di-Dapper Nock-out mechanism

Now that the old-fashioned latch-lever arm which had be raised by hand, or by some mechanism alongside the track, has been done away with, bother and ouble have been eliminated. No lever arms remain to be bent by one car riding another. The Automatic Di-Dapper Nock-outs at the bin unlatch the two independently-operated catches from underneath the cars. Two latches are now provided instead of the former single latch hook. This promotes greater safety. Operating for more than 2 years has proved the great value of this new invention.

We estimate that the savings effected by using our most modern automatic cars with their unequaled carrying capacity, as compared to using the old-fashioned End-Dump and Rotary-Dump cars—and, by the way, we make all sorts of mine cars—amounts to somewhere between 24 and 54 cents per ton of coal handled, which is from 12 to 27 times the average rental cost per ton over a period of 15 years—and no initial cash investment in cars, except freight.



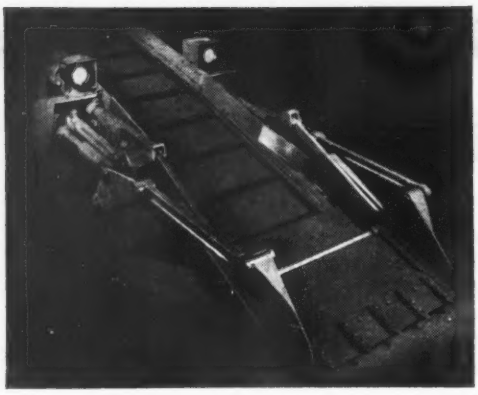
• And, last but by no means least, the S-D "Floater" Ball Bearing Wheel, shown above, and the perfect S-D Automatic Mine Car, give you complete perfection in the most modern coal mine haulage equipment the mining industry has ever known. Let us send you the names of operators who will tell you what this combination is doing for them.

OUR LEASING PROPOSITION

To make possible a complete change-over from end dump or rotary mine cars to S-D "Automatics" without financial burden to our customers, we are glad to make a liberal renting proposition on S-D 1-2-3 "Automatics" whereby you pay a small amount per ton for coal hauled in the cars. The average payment is but a small percentage of the savings per ton. Over 15 years the rental price is less than 2¢ per ton of coal hauled.

Moreover, we give an option to purchase the rented cars at prices which give proper consideration to rents already paid. Details sent on request.

Sanford-Day Iron Works, KNOXVILLE, TENNESSEE



The loader with the natural, smooth, easy, shovel-action loading head.

Here's the Machine That Will Load—In Its Stride—Any Lump of Coal That Will Pass Through Your Tipple, or Any Lump of Rock Your Cars, Aerial Tram or Larry, Can Take.

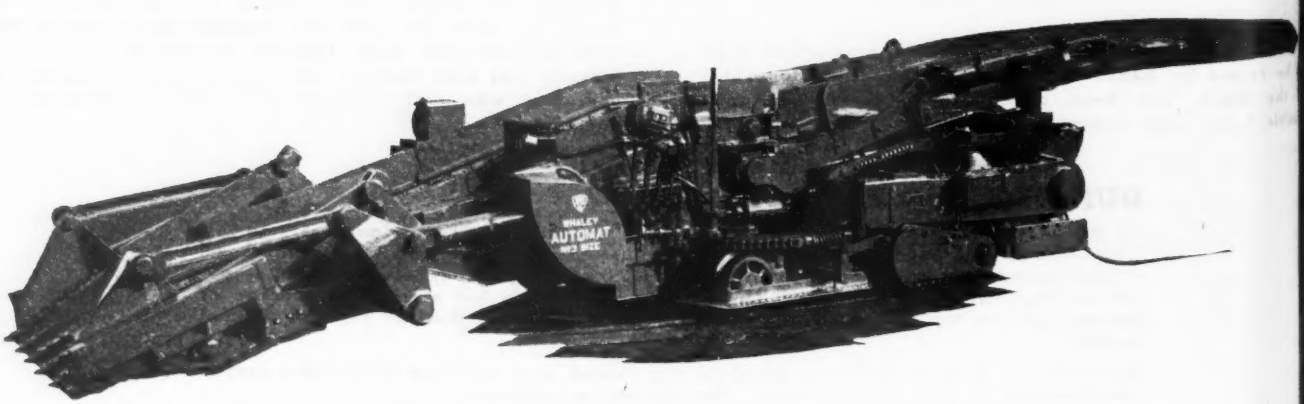
★ Every mine needs such loader service, and you can get it with the "Whaley Automat". This high production machine is the only one with an automatic, natural-action, shovel. It is also the only machine with a parallel-lift rear conveyor.

The automatic shovel action permits cleaning up down to the pavement without taking soft bottom, loading—in its stride—any lump of coal that will pass through your tipple, or, if in rock work, loading any size rock your cars, aerial tram, or larry, can take.

The exclusive parallel lift rear conveyor, always parallel to track, permits taking full advantage of seam height for maximum loading of cars.

In addition, the "Automat" power requirement is only one motor of 25 H.P., and the power consumption only one-fifth KWH per ton of material loaded.

The "Automat" merits your investigation if you plan to mechanize coal or rock loading. Myers-Whaley Company, Manufacturers, Knoxville 6, Tenn.



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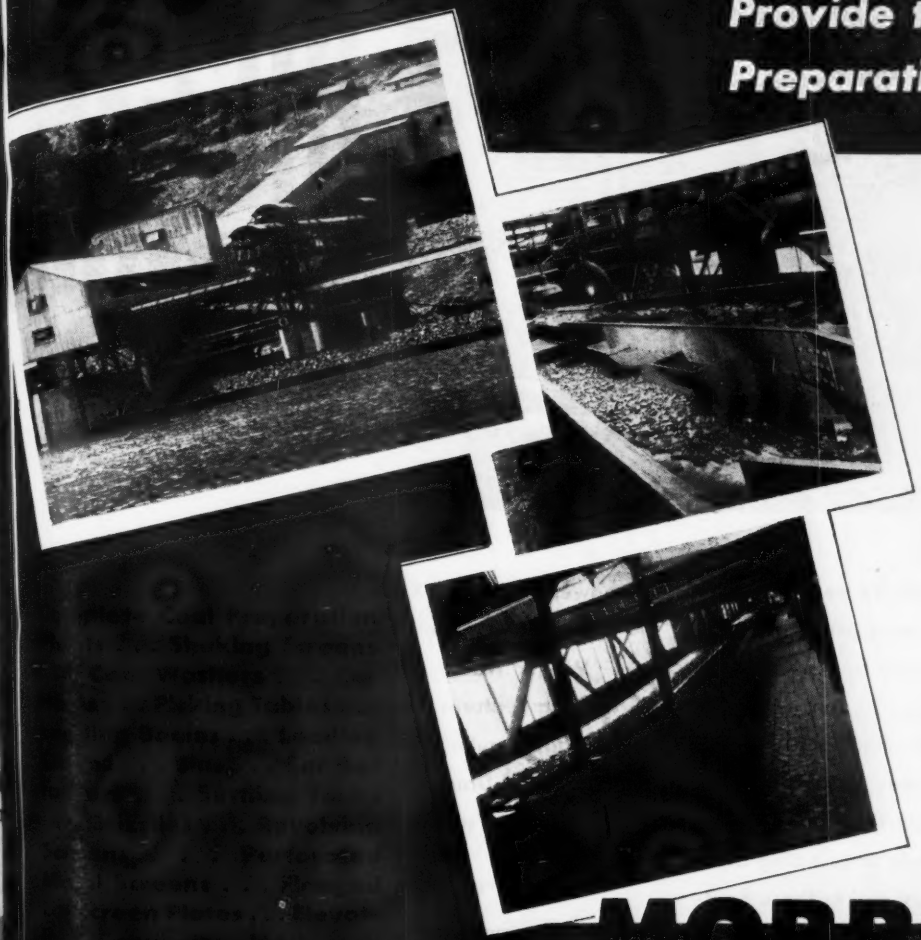
Mechanical Loaders Exclusively For Over 36 Years

COAL AND COAL BY-PRODUCTS

Will provide POST-WAR JOBS and Assist in NATIONAL PROSPERITY

—Only If Coal receives proper Preparation at the mines

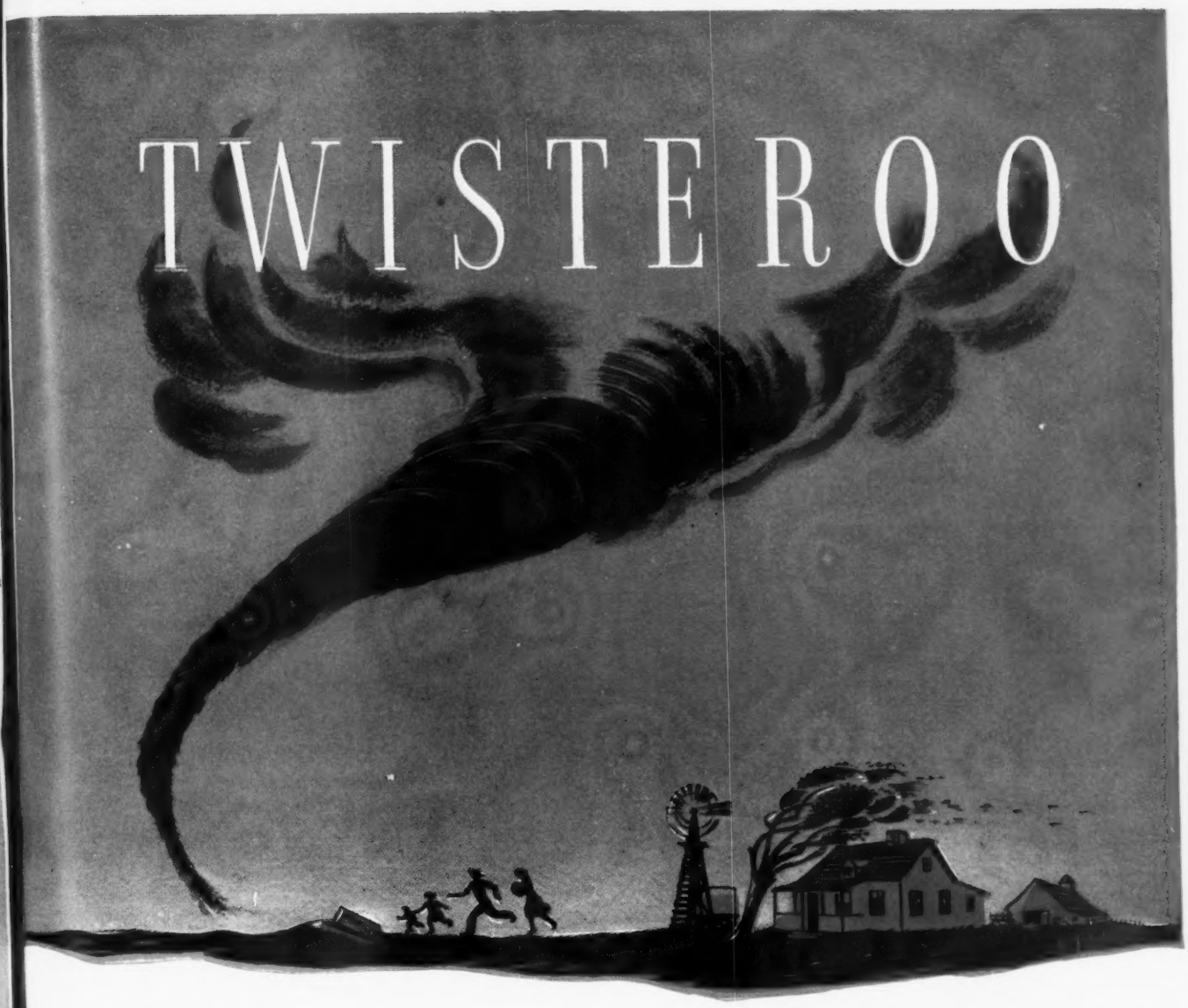
Provide the Proper Preparation Facilities



For over 25 years Morrow engineers have designed and built efficient, dependable coal preparation plants and coal handling equipment to provide the coal industry with a cleaner, properly sized consumer product.

Let Morrow design and build your new preparation plant or completely modernize your present plant.

MORROW



THAT'S WHAT WE CALL the twisting test we give U.S. Royal Mining Machine and Locomotive Cables. They are clamped by steel jaws—bent and twisted twice every second—hour after hour absorbing far more punishment than they would ever get in years of hard service.

Moreover we test U. S. Royal Mining Machine and Locomotive Cables by impact, compression, heat, cold and stretch...so that when they leave our plant and go to you, we know that they are *super-dependable* for just about any kind of work.

That is why Mine Operators and Locomotive Designers can specify U. S. Royal Mining Machine and Locomotive Cables with *absolute* confidence whenever they want balanced construction, flexibility, dielectric strength, smoothness of finish, and long trouble-free service.

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MINING MACHINE AND LOCOMOTIVE CABLES

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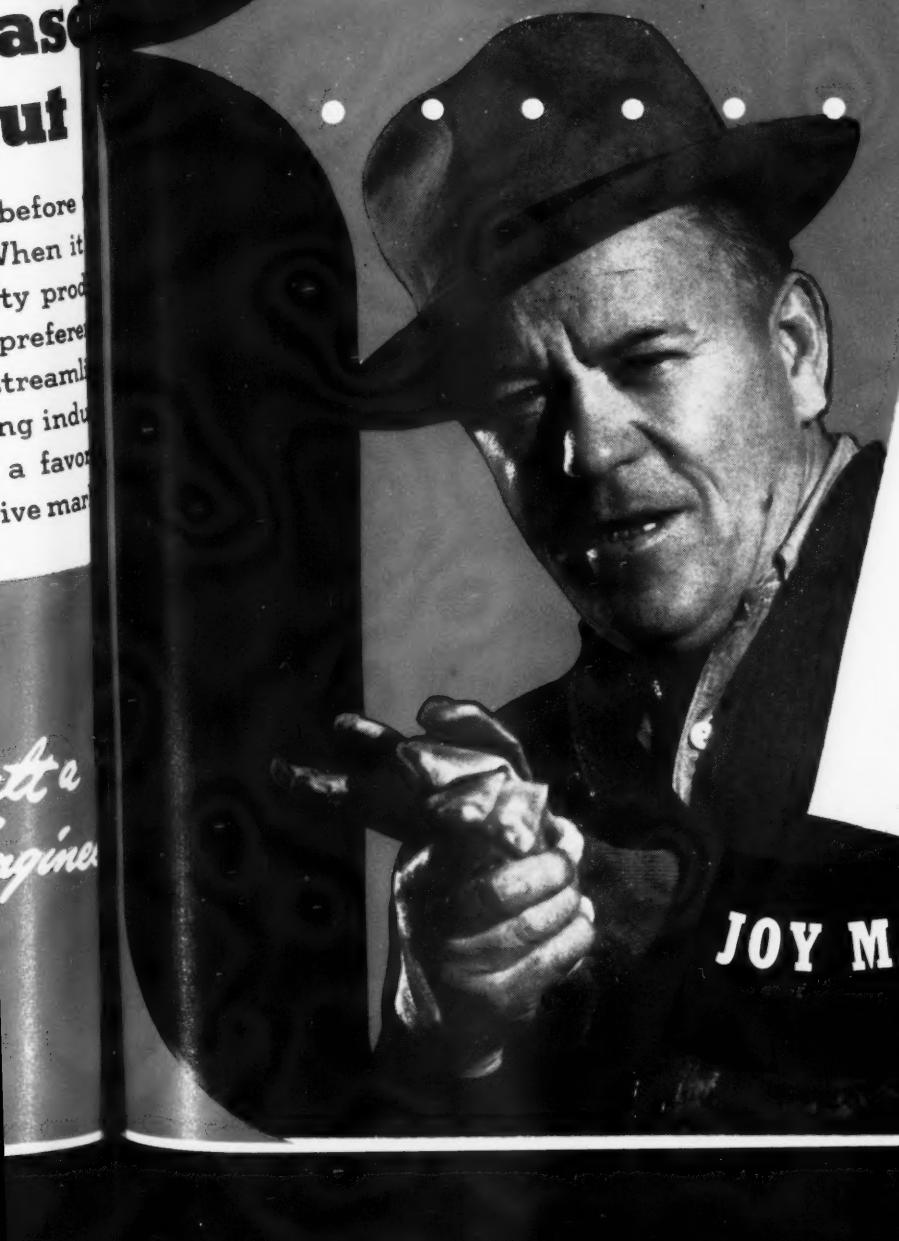
Mechanized mining answers many production problems

There is a place for JOY streamlined mechanized mining methods in your business. We know because our engineers have analyzed scores of similar jobs and shown others how JOY units help production.

Meet competitive markets with modern mining methods

Countless new uses are daily being found for all types of mining products. New synthetics and plastics, as well as new uses for old, well-known materials, will have their place in the post-war world. The race will once again be to the swift, quantity producer. JOY equipment can help you to be the winner.



Check List for postwar plans

1. Replace worn equipment with new, more efficient models rapidly as possible.
2. Analyze where new equipment can do the job better.
3. Re-check marginal operations for possible reopening and profitable working with addition of new equipment.
4. Begin to develop the new operations withheld because of the intervention of war.

JOY MANUFACTURING CO.
FRANKLIN, PA.

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BLACK WAX CHARTER OAK

Black Wax Charter Oak is recommended for all locations where Gray Charter Oak is now used. The fuse has the same high degree of flexibility and excellent waterproof qualities. In addition, the black wax affords a soft, yielding finish that fills in closely around the crimp. When a circular or cut-throat crimp is used with this fuse, a very satisfactory waterproof joint is secured.

Black Wax Charter Oak Brand can, therefore, be used safely in very wet work — and, of course, in damp or dry work as well. Talk it over with your powder company — or us.

Are you using the brand of Ensign-Bickford Safety Fuse best suited for your work? For instance:

If you have . . .	*and now use . . .*	*we suggest*
Very wet work	Double Tape, Single Tape, White Clover, Beaver	Orange Wax Clover
Very wet work	Crescent	This is O.K.
Very wet work	Gray Charter Oak	Black Wax Charter Oak
Damp work	White Charter Oak	This is O.K.

18

ENSIGN-BICKFORD *Safety Fuse* SINCE 1836

Also Primacord-Bickford Detonating Fuse

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, *Editor*

October, 1944

No Solution

NO ONE can say exactly what work stoppages have cost coal—and coal miners—in lost tonnage, wages and profits. But still the losses and the stoppages go on. The latest series grew out of the United Mine Workers' campaign to take over a part of management, even though it means losses for the industry as well as the bosses it presumes to benefit. They confront coal with a real problem in addition to doing little toward holding public regard for the industry and its product.

Whether public confidence in coal can grow and flourish in the face of such threats as that voiced by John L. Lewis at the U.M.W. convention ("I would be prone to recommend . . . that the mine workers of this country would stop mining coal for a time until they could receive assurances from the mine operators of a greater degree of safety" is open to considerable question. Even were the statement scrupulously fair, it still is logical to inquire whether a strike would be the best means of attaining an objective in which the operators are equally interested. There is even less justification for what seems to be the intention to shut down the industry at the whim of the U.M.W. leadership in attempts to use the miners and coal as clubs in organizing other industries.

Protection of fundamentals, such as collective bargaining and the rights of management, still would warrant refusals to yield if they should become points at issue, but otherwise it would seem that relations between coal operators and miners should have reached the stage where stoppages and threats of stoppages, which inevitably curtail coal markets and adversely affect both parties, should no longer be necessary. That conclusion is one that both operators and union leaders should have no difficulty in accepting, unless these union officials, dreaming of unlimited horizons for District 50, have decided that the original union organization—and the coal industry—can be allowed to take the losses involved in serving as vaulting stones.

Now's the Time

COAL, with other industries, is turning at least some of its thoughts to peace, even though still called upon to produce at an unparalleled rate for war. How long that high level of demand will continue still is a matter of speculation, but with a major war yet to be fought in the Pacific, coal, while planning for peace, cannot afford to forget that winning that war is Job No. 1. Afterward, the industry can look forward to the brisk business that will follow release of labor and materials to satisfy the large pent-up demand for civilian goods and comforts.

Many coal companies already have started on their postwar programs and others are in the planning stage. While equipment still is tight, much can be done in that direction. And coal must not forget that other nations are ready to compete for the capacity of our facilities for producing mining machinery. These other nations, in fact, are at it right now.

Although by no means rolling in wealth, coal producers have had an opportunity to acquire some funds. By laying their plans for modernization and getting their orders for equipment on the books immediately, they can help keep business going at a high level and forestall possible large-scale allocation of machinery-producing facilities to foreign orders. By so doing, they can render real assistance to those government officials concerned with seeing that coal's requirements are met. More important, they will be insuring future markets through lower cost and higher quality.

People or State?

THE RIGHT to vote is the keystone of the Republic. But it is useless unless it is exercised. In fact, failure to make use of that right may be worse than useless.

The Republic, it is fair to state, is facing a decision between diametrically opposed philosophies of government and ways of life. For instance, it must choose between the following:

Complete government usurpation of the functions of commerce and industry vs. progress through the free-enterprise system that has made the nation great.

Complete government control over the actions and opportunities of the individual vs. freedom to work, live and find happiness through individual initiative.

In short, the choice is between that philosophy of government built around making the individual the servant of the State and the fundamental principle on which the nation was founded—"government of the people, by the people and for the people."

Votes—and only votes—will decide. This year, of all years, is the time to vote—and to make sure that everybody else votes as well.

Jobs for Veterans:

COAL'S OBLIGATIONS AND OPPORTUNITIES

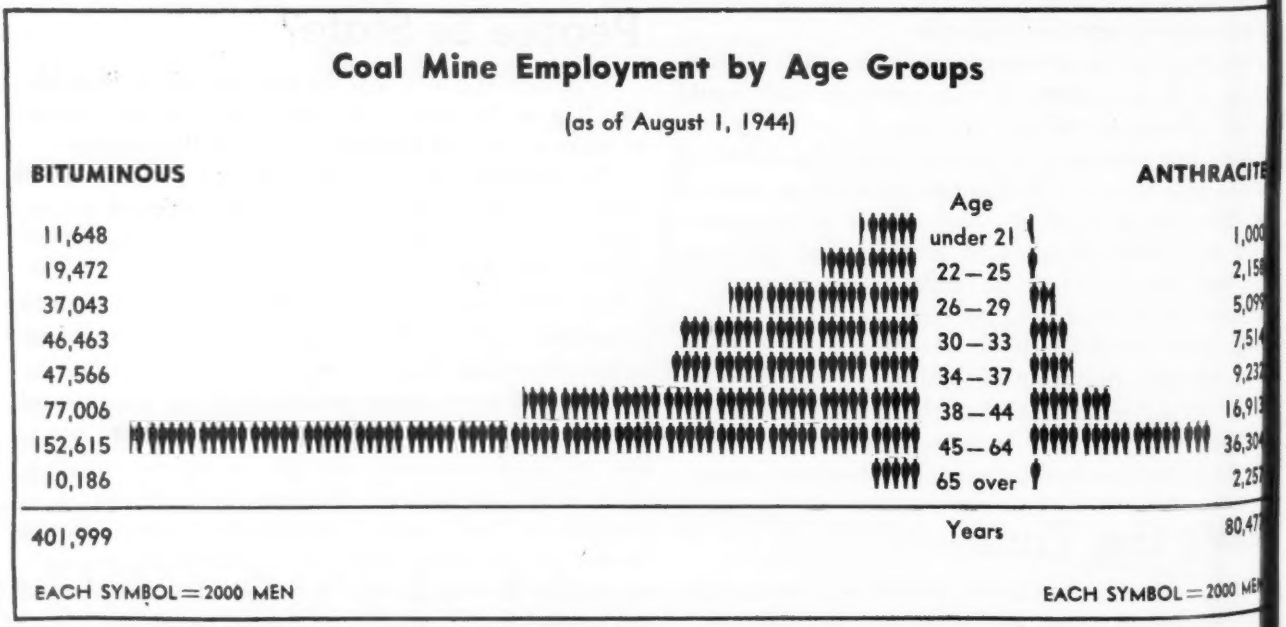
Swift Allied gains on the battle fronts of the world make it necessary to consider the reemployment of veterans now. What obligations rest on the coal operator? On the veteran? Coal faces both a problem and an opportunity.

By JAMES R. SUTPHEN
Assistant Editor, *Coal Age*

WHEN JOHNNY comes marching home this time, the hearty welcome they sing about will not depend on the well-meaning charity of a grateful nation. This time his welcome has been guaranteed by act of Congress, with appropriate penalties if it is anything less than hearty.

Reemployment of honorably discharged veterans of World War II fortunately will present to coal only a few of the headaches that other industry will encounter. Coal will have little, if any, of the overcapacity of the bloated war babies such as aviation and munitions. But placing its veterans nevertheless presents a serious and an immediate problem, not only for top executives who must place men released from the armed forces but for foremen and bosses who must help them become readjusted to civilian work.

While coal is fully aware of and anxious to discharge its moral obligations to its 93,000 sons in the services, there is reason to believe that



WHERE SOME OF COAL'S REEMPLOYMENT OPPORTUNITIES LIE—Not only is coal operating with fewer men than in peace time but the large proportion are up in years. The opportunity for young men from the services is correspondingly enhanced in the postwar years.

ANOTHER JOB NOW, BUT WHAT ABOUT LATER? —When he finishes his fighting career, this service man, or his buddy from the mines, will be looking forward to going back to his place with the men still digging coal. He is entitled to his old job by law and to the best possible treatment.

many of the industry's executives are not completely cognizant of their legal responsibilities. That omission can be quickly corrected by a careful reading of the Selective Service Act of 1940. More serious is the evidence that in many instances complete plans for the reassimilation of veterans are lacking, and the time when such plans must go into operation is fast approaching.

The Selective Service System says that as of Sept. 1, 40,000 men were being discharged monthly from the armed services, and that only a very minor percentage of those were combat casualties. Under demobilization plans just revealed, between 1,000,000 and 2,000,000 men will be mustered out at the end of the war with Germany, and those with the longest combat and service records and with dependents will be the first to come back. Whatever army of occupation may be needed in Europe will be drawn in so far as possible from men now in this country. Selective Service estimates that it will take about 13 months after the fall of Germany to get back from Europe the men now there. Demobilization and replacement of the armies now in Europe will start as soon as the fighting stops.

All of which adds up to the fact that bulk reemployment of veterans is a matter with which coal may have to cope tomorrow, not next month or next year.

Is coal ready to handle it? What are its obligations, moral and legal, to its veterans? What plans have been made or discussed for the quick reemployment and the sympathetic readjustment of veterans? How much of an impact will the discharge of 11,000,000 or more men and women from the armed forces have on coal? How will the future economy and prospects of the industry affect the veteran? How will the future economy and prospects of the industry affect the veteran? How can complications between union regulation and congressional statute be avoided? What have coal companies learned thus far from their experience with discharged veterans?

To obtain the answers to these questions, *Coal Age* consulted officials of the Veterans Personnel Division of the Selective Service System, the rehabilitation division of the Veterans Administration, the War Manpower Commission, members of Congress, the United Mine Workers of America, the Solid Fuels Administration for War, personnel directors and other executives of leading anthracite and bituminous producers, and the secretaries of coal associations.

Two mental concepts this study shows are a necessary preliminary to any discussion of the returning veteran

and his place in American industry:

1. The matter must not be approached as a problem but as a distinct opportunity.

2. There is as much obligation on the part of industry to adjust itself to the veteran as there is on the part of the veteran to adjust himself to civilian life. Each can help the other. Without such joint action, both may fail.

What is the precise manpower situation which coal will face with the end of hostilities? According to the latest government and industry statistics, bituminous coal is now operating with 402,000 wage earners and anthracite with 78,000 in getting out a combined total of 690,000,000 tons. Best calculations would indicate that the end of the war may mean a cut of about 100,000,000 tons in coal demand, so that coal will need a peace-time working force capable of producing something more than 500,000,000 tons of bituminous coal and 55,000,000 to 60,000,000 tons of anthracite. In the last prewar year, 1940, 91,000 anthracite miners produced 51,000,000 tons and 439,000 bituminous miners produced 453,000,000 tons. Thus it may be safely assumed that a normal working force for peace-time needs would be 90,000 anthracite and 450,000 bituminous miners.

There are several accountings of the number of coal miners in the armed forces, all varying in some degree. A reconciliation of company estimates, U.M.W. local reports, records of the Pennsylvania Anthracite Committee, the National Coal Association and the SFA places the number at 80,000 for bituminous and 13,000 for anthracite. Both figures probably are conservative. A certain number, unfortunately, will be casualties. Others simply will drift away and others will stay in the armed forces.

Some Won't Return

How many will want to return to coal mining is anyone's guess. Estimates of coal operators vary all the way from one's pessimistic 10 percent to another's conclusion that at first few would return, but that as employment grew scarcer, men would seek the work they knew best. Selective Service figures indicate that about 20 percent of the men thus far discharged have sought their old jobs. But that figure is misleading because it does not take into consideration how many had jobs to which to return. Many entered the armed forces direct from schools or were unemployed. As one concrete instance, however, one of the leading anthracite producers reports that of 56 of its employees honorably discharged, 36 applied for and received their old jobs, 7 failed to report after jobs had been given them, 2 resigned because of service-incurred physical disability and 11 have not returned for reasons unknown. Thus 64 percent are back at work.

Research technicians say that three out of every ten veterans will want to go into business for themselves. It is certain that many who entered the army as common laborers will come out skilled mechanics, capable of and entitled to responsible jobs and high wages. Many who entered as callow youths will emerge mature veterans, accustomed to lead and command and who will be first-rate, if still untried, executive material. Others will want to continue their education. Taking

THE VETERAN AND HIS JOB

The Selective Service Act of 1940 provides that:

THE EMPLOYER MUST: Restore honorably discharged veterans of World War II to the same jobs they had before their induction, or to jobs of like seniority, pay and status if their old jobs no longer exist, unless the employer's status has altered so that such restoration would be "impossible or unreasonable."

Treat discharged veterans as though they had been on furlough from their jobs and restore them to their previous seniority and to all rights of insurance and other benefits prevailing at the time the employees left for the armed forces.

Retain the discharged veteran in his job for at least one year from the date of his return unless he is guilty of misconduct or leaves of his own accord.

Abide by the provisions of the act or face court action for proper restitution to any veteran whom the court decides has been deprived of his rights under the act.

THE VETERAN MUST: Apply for his old job within 40 days after his discharge.

Accept an offer of his old job or one like it or forfeit his privilege of demanding work from his old employer.

Show evidence on demand that he is physically capable of handling the job offered him.

These are the provisions of the law. The burden, however, is on the employer and, in effect, he is expected to take all reasonable measures to see that returning veterans receive not only their legal rights but also all additional assistance that may be necessary to enable them to cope with readjusting themselves to civilian life.

everything into consideration, it would seem reasonable to figure on a maximum of around 70 percent returning to coal mining. Thus anthracite should be prepared to reemploy 9,100 men and bituminous 56,000.

They're Needed Now

Is there room for them? Yes, and to spare. Right now coal could use an additional 60,000 men—12,000 in anthracite and 48,000 in bituminous—to bring their working forces up to normal. But in addition to normal requirements there were, as of Aug. 1, 1944, 2,257 employed in anthracite and 10,186 in bituminous who were 65 years of age and over. They have played a gallant role in coal's wartime drama, but they are tired and ready to retire. It would not seem unreasonable to suppose that a like number of the 189,000 in the 45–64 age group in both industries would be ready for a rest. Thus an approximate 5,000 men in anthracite and 20,000 in bituminous are likely to make way for younger men as soon as they feel their own obligations have been discharged.

As a result there are, or will be, openings for 68,000 men in bituminous and 17,000 in anthracite, adequate to reemploy all veterans who apply for their jobs and still have room for more.

Theoretically, it might be held that many more workers would be necessary when the industry goes back to a 5-day week. But the gain in working force which that might be calculated to represent would not be realized in most cases in active practice, except where companies desired to continue on a six-day basis or work more shifts a day. In such cases the elimination of sixth-day work by employees, or the inauguration of an additional working shift per day, would require hiring more men or having other changes in equipment and methods, if the same daily rate of output was to be maintained. How much the industry needs for men will be affected by such factors is as yet a question, but it can be said that it should tend to better the reemployment opportunities in coal.

All in all, the evidence indicates that coal will continue to need good men long after hostilities are over. The armed forces should be an excellent source of supply for the skilled workers that modern mechanized coal mining will require. But it may not be a question, as pointed out in "Tomorrow's Miners" (May, 1944, Coal Age), of putting them back on the payroll as they flock back but instead one of carrying out an active campaign of persuading ex-miners, and good non-miner candidates, that coal offers them, as it does, real opportunities in the future.

But if reemployment itself seems to present few immediate difficulties to coal, readjustment is something else. The company's legal responsibilities end when the returning veteran goes back on the payroll. Its moral obligations have only begun. It is obvious that in the busy and perhaps trying days of the postwar era, the front office, even though it may want to, will not have the time to oversee the satisfactory readjustment of every veteran it hires. That important function properly will become the duty of the foremen and other operating officials.

Executive management can frame policy and see that the veterans get their jobs back. The personnel office can place the veteran in the job for which he seems best suited and watch his progress to see whether any change is indicated. But in the final analysis it will be the attitude of the men with whom the veteran works which will determine whether he is happy, whether he makes a success of the job, whether he himself discharges his responsibility to his employer.

The returning veteran, even though he may have been an old hand, will see new faces, perhaps new methods. Certainly he will feel strange for a while at least in his new surroundings. The first day he is on the job may decide whether he can successfully adjust himself to civilian life. It may be determined in the way the foreman introduces him to the other men, the way he explains his new duties and the new machinery with which he is to work, the patience and consideration which he shows in realizing that it's a wide jump from the battlefields of Germany to the coal fields of Pennsylvania.

The foreman will need all his tact and skill to make a success of veteran readjustment. Some of it can be done before the veteran arrives. The alert foreman will explain the situation fully to his crew members, tell them how he wants them to act, warn them against too much talk about the war, against too much prying curiosity, against both patronizing and hero worship. Above all, he will caution them that the returning veterans want to be treated by their fellow workers just like any other new man on the job, not like a novelty on display.

The foreman will run up against his greatest problem the first time he has to call down a former veteran for loafing, for loading dirty coal, for unsafe practices. An ex-Marine sergeant may not take kindly to being told he can't shoot the breeze with his fellow workers when he's supposed to be on the job. A man who has faced a Panzer division is likely to forget the danger in a bad roof.

Each case will require special handling, but in general the wise foreman will be extremely cautious in disciplining a returned veteran in front of other men. A frank, private talk may reveal to both employee and foreman how best to solve their problems.

Many industries and some coal-mining companies have already anticipated this phase of the question and are giving their foremen special instruction on how to treat discharged veterans. It is a practice to be commended.

Executives, personnel directors and foremen will find that things will go more smoothly if all of them know what the law requires of employers in placing returning veterans. A brief summary of the principal provisions of the Selective Service Act of 1940 are given elsewhere in this article. They tell only part of the story. Four documents, available from the Government Printing Office, Washington, D. C., or from members of Congress, should be in the hands of every executive, official and boss in coal mining. They are the Selective Service Act itself, the Selective Service System's bulletin "Information Concerning the Veterans Assistance Program," June 30, 1944; Public Law 346, 78th Congress, the so-called "G. I. Bill of Rights;" and Senate Document 152, a pamphlet explaining the rights, benefits and privileges of veterans of all wars.

A Typical Case

To illustrate how veteran reemployment will work: take the case of Joe Smith, former loading-machine operator with Company X, southern Illinois. Joe, 27, married and the father of one child, was inducted into the Army in 1942, went through basic and advanced training and was sent to England. A loading machine is not unlike an armored vehicle, and Joe soon found himself a sergeant, riding herd on a tank on the road to Berlin. Time advances a little and the German army is cut to ribbons. The Nazis beg for peace. Because Joe is married and has a kid he hasn't seen in two years, because he has served two years and because he has been in the thick of the fighting, he is one of the first to come back. He looks around and asks himself, "Now what?"

All of Joe's roots, his family and his experience are in coal mining, so he decides to return to it. He goes first to his local draft board. Joe tells the member who has been designated

to take care of discharged veterans that he wants his old job back. The draft board member calls Company X and tells them about it. Joe has complied with all the regulations, he has asked for his old job within 40 days after his discharge, he is physically fit, and his old job, although filled, still exists. The company wants Joe back and puts him on at once. That will be the procedure in a great many cases. But even though the company, for one reason or another, might not have wanted to hire Joe, as long as the job he had previously was still there, he would get it, unless to do so would be "impossible or unreasonable" for the company.

But what about Bill Jones? Bill is 38, married, with four kids, and when Joe left he took over the loading-machine job and has been doing it to everyone's satisfaction. That's too bad, because in the eyes of the law Bill is a temporary employee. He took the place of a man inducted into service and all he has been doing is filling that job until Joe gets back. Bill is out. Fortunately at Company X they need loading-machine men, so Bill gets another job and everyone is happy. But if there had been only one job Joe would have been the one entitled to it. That is where the clash will come in overexpanded war industries when they adjust their working forces to peace-time requirements. Coal can thank its stars it probably will have room for everyone now in the industry and who wants to stay, as well as for its veterans.

The Disabled Vet

What would have happened, however, if Bill Jones, taking over Joe's old place, had himself been inducted? The same thing. Bill is still a temporary employee and the job goes to Joe. Bill has no right to that job, although the company, of course, has a strong moral obligation to rehire him. Selective Service says that in the instances where that has happened so far the companies have made every effort to place the Bill Joneses and hope that this will continue to be the situation.

What would have happened if Joe had been wounded, badly hit in the leg, partially crippled but still able to make a living? He could do one of two things: apply for his old job and undergo a physical examination, or apply to the Veterans' Administration rehabilitation division, which would give him advice on what new career to follow, train him for it, and try to find a job for him in it. If he asked for his old job, he would undergo a physical examination by the company physician. If the company physician passes him, well and good. If not, Joe has the right to consult his own physician. If the two reports disagree, Joe can, if he wishes, take the case to court, and if the court rules Joe can handle the job, he gets it.

If both doctors agree Joe cannot do the job, the company's legal responsibility is at an end. But, obviously, it will try to find a place for Joe if he wants it. There are not too many openings for disabled men in coal mining, but there are some and coal assuredly will follow the pattern of all other industry and do its level best to place men who come back physically handicapped, although nothing in the law says it must.

But supposing that Joe is just a little cocky, and rightfully, about his war record. He rose to be a top kick, he won the Silver Star, and he fought and whipped the best the enemy could throw at him. He feels perhaps that his old job is not quite good enough for him. He feels he has gained experience and skill as the result of serving in the best trained army ever placed in the field. He tells the company so. Once more the company's legal responsibility is clear. It has to give Joe his old job or one like it, if it can. There is no legal obligation to give or offer him a better one. Again, however, most companies will see Joe's point of view, and if he is worth a better job, will try to find one for him. Thousands of men will come out of the Army better equipped and more mature than when they went in. Industry would only be penalizing itself if it did not try to find adequate places for them, but there is no legal responsibility to do so.

The law gives Joe all the breaks. And who's to say he does not deserve them?

How will this priority of work for veterans be reconciled with union regulations? Some operators frankly expect difficulties, if not quarrels, to develop, but at headquarters of the United Mine Workers of America there was no expressed worry about what would happen. "We'll comply with the law, not stop short of it," one of its officials said. The law does not require that returning veterans join a union, but it is a safe guess that almost every one of those who will return to a coal-mining job was a union man when he entered service, and his status has been maintained.

Two factors in coal, it is held, will combine to make union regulations more compatible with the law of the land than in some other industries: the nature of the work, and what a U.M.W. official called the "traditional community interest" of the coal miner. The first factor will in itself take care of any spreading of work that has to be done in slack times. Only in rare instances is anything except a full crew required for mining operations, which means that when one works, all work. It may at times mean less than a full week's work, but it obviously would be impossible to give veterans a five-day week if the rest of the mining operations required but three or four days.

Some Will Suffer

The veteran has the right to insist that if work is available it go to him. But the union believes that the average veteran will not prosecute that claim, especially if it is going to work out to the detriment of his fellow workers. That is part of what is meant by the community of interest in the coal fields. What work was available has always been shared by all. The union sees no reason to believe that priority rights for veterans will change that custom.

Displacement of men by veterans, necessitating that the former go on a waiting list or seek other employment, may, in some instances, undoubtedly work a hardship. One company executive pointed out that there is going to have to be a severe and unwelcome adjustment by families which now have anywhere from two to a half dozen wage earners and which after the war will in all likelihood be reduced to one. Several coal men have pointed out that in their companies or districts reemployment of veterans is likely to be at the expense of men now working. Many of these who may be displaced, it is pointed out, are, however, emergency workers, hired under lower physical standards, over age and, at times at least, inefficient. But if any happen to be the family's only breadwinner, the fact that they are not high-grade labor is going to appear rather academic to them if they are out of jobs.

The union believes, however, that generally speaking there will be adequate work at least for some time after the war. It recognizes that demand will fall off, but points out that many new mines will be opened. One union official said that many of the mines now being worked are nearly exhausted and that new openings will require considerable manpower. Later on, increased mechanization will bring a demand for more skilled men.

There are, unfortunately, only scattered case histories of discharged veterans thus far in the coal fields. Some men have come back honorably discharged and physically fit, and where

COAL'S ABILITY TO ABSORB ADDITIONAL EMPLOYEES*

	Bituminous	Anthracite
1. NORMAL PEACETIME WORKING FORCE	450,000	90,000
2. PRESENT WORKING FORCE	402,000	78,000
3. IN ARMED SERVICES	80,000	13,000
4. OVER AGE, READY TO RETIRE	20,000	5,000
EMPLOYMENT CAPACITY		
5. NEEDED NOW FOR NORMAL FORCE (ITEM 1 MINUS ITEM 2)	48,000	12,000
6. OVER AGE, READY TO RETIRE	20,000	5,000
7. GROSS EMPLOYMENT CAPACITY	68,000	17,000
8. ANTICIPATED MAXIMUM JOB DEMAND BY VETERANS (70 PERCENT OF ITEM 3)	56,000	9,100
9. NET EMPLOYMENT CAPACITY REMAINING	12,000	7,900

*Estimated from best available data and opinion on employment and prospects for coal mining in the future.

they have applied for their old jobs have received them promptly. Where their old jobs were filled, they were given others with comparable pay and status. No instance has yet been reported of veterans asking for better jobs, but a few have been given their old jobs and failed to report. Most companies believe they can reabsorb returning veterans without any serious dislocation of their present staffs. That statement, however, was almost invariably qualified by speculation on the future market for coal.

Still another factor will be the young men from coal-mining communities who entered the armed forces direct from school. One West Virginia executive estimated that 50 percent of the returning veterans would fall into this class and he called them "our best potential employees." There is no legal obligation on the part of coal companies to employ such veterans, since they did not leave jobs to enter the service, but progressive operators will see at once the value in trying to make places for them, as they will bring youth and ambition to the industry.

With certain notable exceptions, there is, however, a definite indication that coal as yet has not begun to gear itself to handling returning veterans and, further, that employers are still somewhat hazy in regard to their legal, if not moral, obligations. While the present acute manpower shortage which almost every operator mentions undoubtedly will make veterans' reemployment less difficult in the coal fields than in many industries, there nevertheless is a definite and delicate psychological adjustment to be made. Little time remains to get ready.

The Servicemen's Readjustment Act of 1944 and the employment provisions of the Selective Service Act were very properly designed to keep GI Joe off the wrong end of any postwar breadline. With that lofty purpose no one can quarrel. But, like most noble ideas, it will not be one bit better than the people who are charged with executing it—in other words, management. Should management fail to live up to its complete obligations, legal and moral, to the ex-service man, no legislation can remedy the situation. For instance, the phrase "impossible or unreasonable" could open a wide escape hatch to an unscrupulous or conscienceless employer. Government, too, has its obligations to help industry meet the situation, foremost among which is a tax system designed solely to raise revenue and not to punish. But management cannot wait for that day. Its responsibilities are present.

The coal industry is well aware of the heavy debt it owes the men who left its mines to fight on the battlefronts of the world, and even without compelling legislation would strive generously to repay it. The only other factor which can veto GI Joe's guaranteed rights is the economic collapse of the industry—a very remote possibility unless all the signs are wrong. There is every reason to believe that coal will suffer less from the return to peace-time operation than other industries and that it will profit equally with them from the demand for long-exhausted civilian goods.

There unquestionably is a physical place for the returning veteran in coal, guaranteed by law, if he wants it. It is up to the coal industry—as it is to every other industry—to supply the warmth to the welcome. But there is a selfish angle too. In the past few years coal has reawakened along many lines: a new concept in its public relations; an aggressive search for new markets; heavy investment in improved equipment and methods; and generous support of intensive research. The men returning from the armed services will be sober men with progressive ideas, with skilled hands and trained minds. They can supply that transfusion of young energetic blood without which all the other advances the industry has made would stagnate.

They will not be satisfied with the same old conditions, the same old standards, with a ceiling on their ambitions and hopes. They are going to be buying the apples this time. They fought many a hard battle for the pursuit of happiness. They will not flinch from fighting another.

STORAGE BATTERIES

Power Drilling Train for Gangway Work

Equipment Is Assembled on Mine Trucks—Operates as a Self-Contained Unit in Any Section of the Mine With Track—Batteries Good for Two Shifts—Water Under Pressure Used to Flush Out Drillings

By RALPH R. RICHART
Assistant Editor, Coal Age

A BATTERY-POWERED compressor unit supplying air for rock drills has speeded up the driving of gangways, tunnels and rock holes in underground operation at the Colket Drift, Necho Coal Co., Donaldson, Schuylkill County, Pa. After the compressor-drill train has been spotted by one of the battery haulage locomotives, a driller and his helper are the only men required for operation. The equipment is worked one 7-hour shift each day to provide the necessary development work for the entire mine operation, which has workings in the Buck Mountain, Seven-Foot, Skidmore and Mammoth veins. It has been in operation some 18 months and has lived up to the expectations of the management.

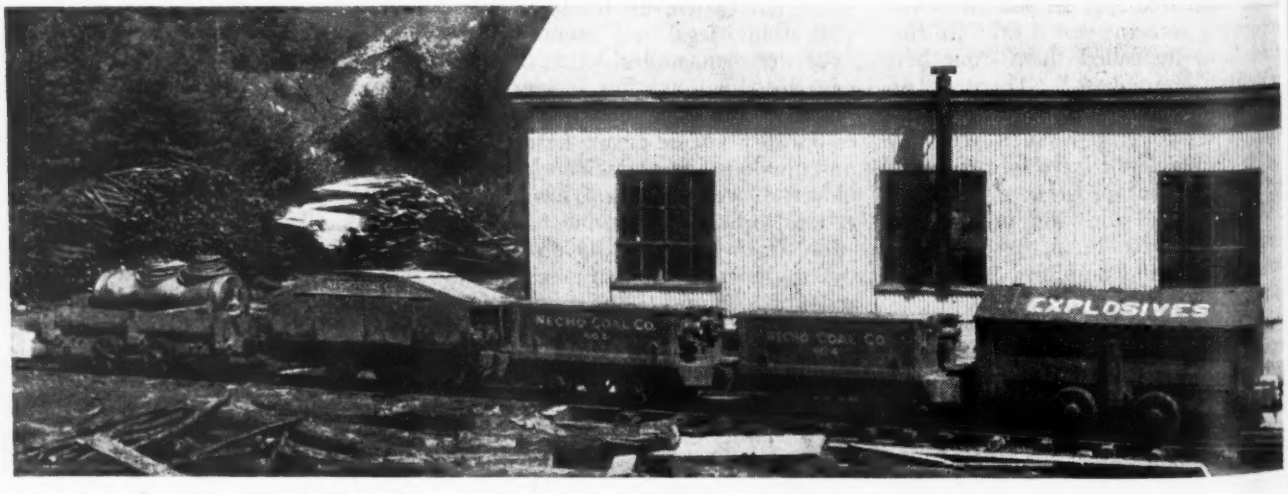
To meet a need for a self-contained drilling outfit the management, with certain objectives in mind, worked out the unit in cooperation with the Medico Electric Co., Pittston and Pottsville, Pa. The care devoted to the original design is reflected in the fact that no major modifications or changes have been made in the equipment during its 18-month period of service. The complete compressor-drill train, excluding the storage-battery locomotive used for moving and spotting it, consists of the following units, listed in the order in which they are found as the drilling scene is approached: explosives car, two battery cars, air-compressor car and a water-tank car with post-mounted drill equipment and all accessories.

Free of Connections

The independence of operation possible with the train can be appreciated from the fact that no airlines enter the mine while electric lines run only a short distance into the drift to serve a centrifugal pump and ventilating fan. Aside from the fact that a generous supply of fresh air courses the mine, there are only the telephone circuits and the 44-in.-gage track to suggest any connection with the surface. This train can be spotted anywhere there is fairly level track.

Using air and water at pressures of 95 to 110 lb. on the post-mounted drill equipment, a two-man crew in solid rock-hole work can drill and shoot 18 7-ft. holes in a 7-hour shift. In rock-tunnel work these same two men can drill and shoot from 21 to 28 9-ft. holes in two 7-hour shifts. The compressor equipment is capable of supplying air to two drills simultaneously, but both are not necessarily in operation all of the time. Timken detachable rock bits with hollow steel in 2- to 10-ft. sections are used in all the drilling work. All holes are started with a diameter of 2¼ in. and, depending upon the hardness of the material encountered, are finished up with a diameter of at least 1½ in. Holes are charged with 1¼-in. sticks of 60 percent dynamite and all shots are fired by electric caps. Wedge shots are fired instantaneously, but timers with delays ranging from 1 to 8 seconds are used on all the other shots.

Storage batteries supplying power to the compressor motor are installed in drip-proof demountable battery compartments mounted on regulation mine-car running gear. Each compartment or battery box has a 56-cell Philco Type 23 XL battery equipped with its own charging receptacle and ampere-hour meter. The cell circuits of the two cars are connected in series to supply power at 230 volts. When the cells of both cars are completely charged, they will drive the compressor



Compressor-drill train standing alongside the machine shop waiting to be pulled inside by a storage-battery locomotive.

for two regular 7-hour shifts of drilling. Both battery cars are brought out to a charging station, at the machine shop near the drift mouth on the surface, for recharging either at night or on an idle day. The capacity of the batteries is such that the drilling operation never has to be suspended during a normal drilling shift, since a full charge always is good for two full shifts of operation.

Mounted on the compressor car is a 50-hp. Westinghouse Type SK 230-volt d.c. motor which drives a Schramm Model 210 air compressor. The compressor has a rating at sea level of 210 c.f.m. at a speed of 1,200 r.p.m. The motor is belted to the compressor by seven Goodyear Type C-105 V-belts. The compressor has its own radiator-type cooling system and air receiver mounted on the same truck. A Cutler-Hammer fused safety switch and manually operated starter afford the necessary protection for the motor. An unloader mechanism on the compressor prevents unnecessary popping-off when air is not being taken from the receiver. All the equipment on this car is mounted in a drip-proof inclosure with sliding doors on both the top and sides. This inclosure likewise is mounted on regulation mine-car running gear.

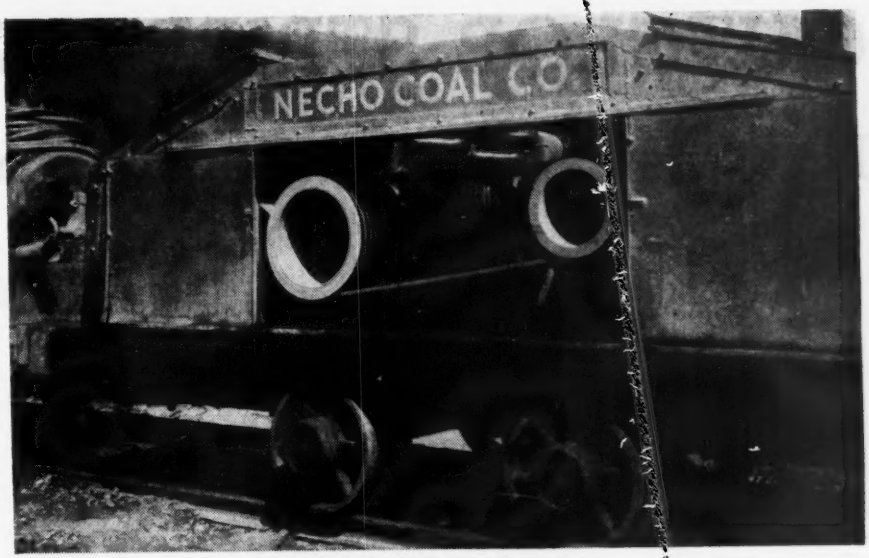
Includes Water Car

Next to the compressor car and the last car before reaching the working face is the water tank car on which all drilling equipment is racked. When the drilling equipment is in operation the full pressure of the air-compressor receiver tank is applied to the water tank, and thus water under pressure is available for keeping down dust and flushing out the drillings as the hole is driven. Gardner-Denver post-mounted drills with hand and automatic feed are used at the face.

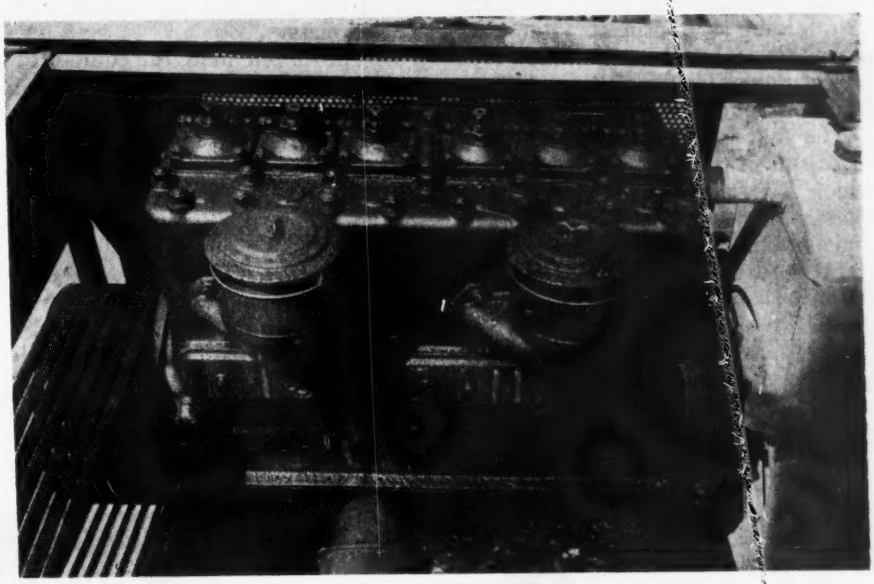
A four-circuit Hertner Electric charging panel controls the charging current from generator to each battery box during charging. Each circuit is rated at 135–30 amp. The three-bearing Westinghouse motor-generator-type charging set consists of a Type SK 50-kw. 125-volt generator and a Type CS 75-hp. 3-phase 60-cycle 440-volt induction motor.

Each battery box for the compressor-drill train is a duplicate of that being used on a Goodman 10-ton battery locomotive which handles part of the main-line haulage service.

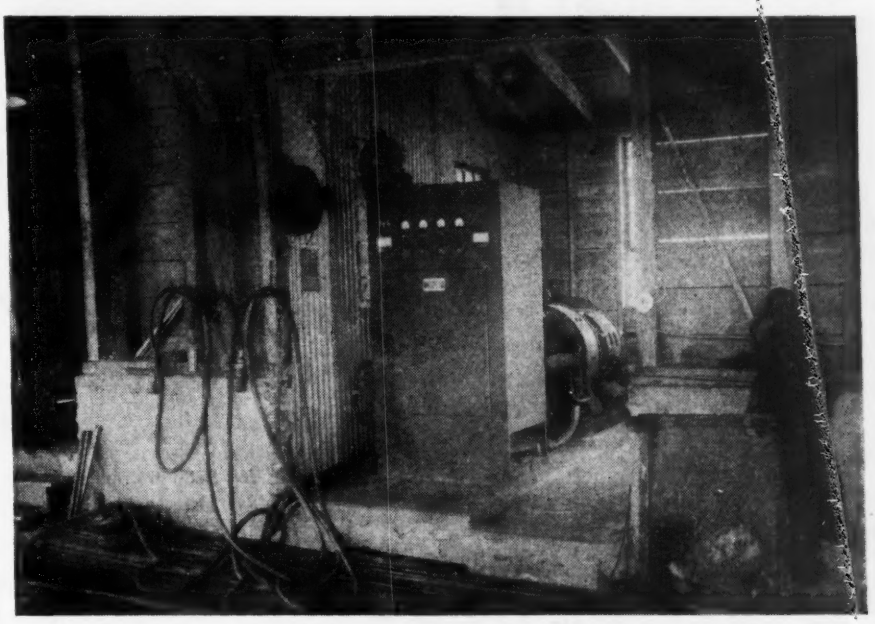
Officials in charge of operations are: William J. Bashas, general superintendent; John A. Gottschall, mine foreman; and Claude Lawrence, electrical engineer.



Compressor and drive as viewed through the sliding doors on the compressor car.



Compressor and cooling radiator as viewed with the top covers moved back.



Batteries are charged from a station on one side of the machine shop.

OUTCROP STRIPPING

Provides Work for Contractor's Equipment

Strip Mining a Problem in Materials Handling—Small Shovel Adequate for Small Stripping Assignment—Road Grading Equipment Plays Important Role—Lightweight Tractor-Drawn Drill Used

JUST AS IN THE EAST, the Middle West has many small stripping operations which salvage coal from narrow valleys and the fringes of shallow mines. Some of these are owned by roving operators who follow scattered strip mining as a business. Others are managed by contractors who seek temporary use for their idle equipment for the duration.

The following is a description of a successful strip mine of the latter type, which takes advantage of one of the many opportunities in areas where underground mining stopped after reaching roofless coal. It illustrates the effective work that sometimes can be done with small shovel equipment.

This operation is one of the smaller of several similar mines in the rolling country around Madisonville, Ky., where Hart & Hart, contractors, of Columbus, Ohio, found ribbons of good strip coal around the edges of abandoned underground mines, the hill part of which had been mined out. It demonstrates what can be done with little patches of coal when conditions are reasonably good.

Except for one item, the equipment is all contractor's material right off the job. The exception is a small portable auger drill, designed by the Harts and built especially for their strip-mining projects. It is used for the double purpose of prospecting available areas and for drilling the highwall where the slate cover requires shooting for dragline stripping.

The drill, mounted on a two-wheeled rubber-tired trailer, consists of a set of vertical guides and a drillhead driven through bevel gears by a small gasoline engine, the whole being mounted on a common base that drops down vertically as the drill sinks into the overburden or coal. Small auger drills in about 5-ft. lengths require a supporting frame not more than 9 or 10 ft. above the surface of the ground. The weight of the rig is correspondingly light. When being moved, the position of the engine and drillhead is just above the axle, so that the center of gravity is very low.

An RD-4 Caterpillar tractor doubles in brass by leveling the ground where the drill is to work and hauling the drill trailer from place to place. It is fitted with a bulldozer blade for leveling and for road clearing when the drill is moved. The tractor also furnishes power to lift the drillhead for starting the drilling and for adding the auger extensions.

During the drilling operation, the

Dragline bucket being filled with shale. Perforations in sides and back of the bucket indicate a weight-reducing step.

Prospecting and overburden drill designed by the Harts. Drill augers are carried at the base of the frame. Drill trailer is coupled to tractor.

tractor engine raises the drillhead and engine by a wire rope on a drum. The auger is inserted and the hole drilled to that depth. The drillhead is then lifted and a second auger length inserted. The process is repeated until the required depth has been reached. This drill is a mobile unit which drills rapidly and turns out work in record time.

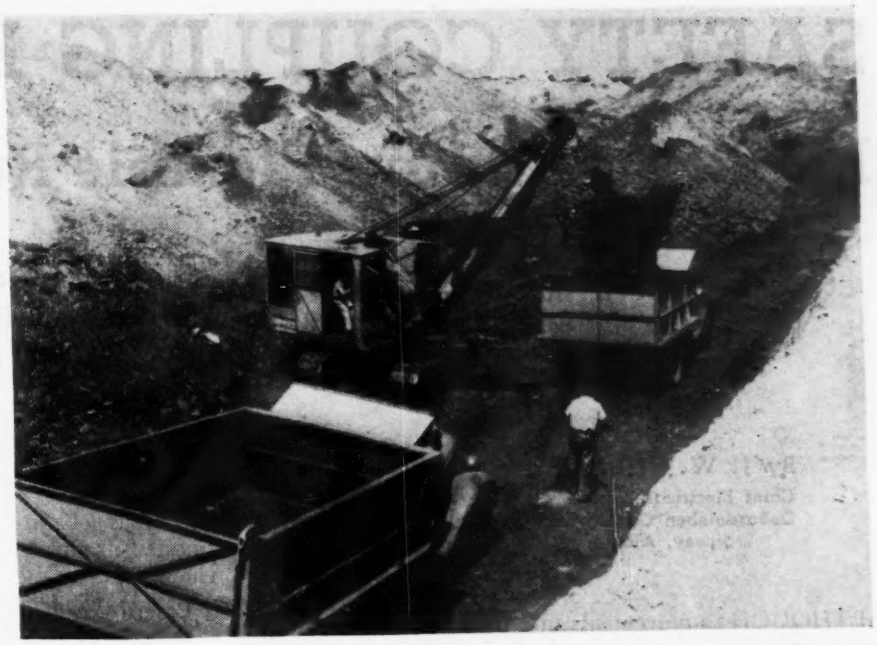
The stripper is a P & H 2½-cu.yd. dragline. The bucket sides are perforated with round holes approximately 3 in. in diameter to reduce bucket weight. There is not a large quantity of slate to be removed and therefore the stripper, despite its small bucket, is able to keep well ahead of the loader.

The coal averages 5 ft. in this particular operation, and the overburden of clay with some shale is about 20 ft. The coal, which is rather hard, is drilled with jackhammer-type air drills and is shot in groups of about eight holes, so that the maximum size of the lumps does not exceed 10 in. All holes of a shot are wired in series and fired with an electric blasting machine.

The coal, which is loaded by a Koehring shovel of approximately 1-cu.yd. capacity, into rear-dump trucks of about 6-tons capacity, has a nice clean appearance for strip coal. A firm floor under the coal is partly responsible. Production is at the rate of 750 tons per day. This area is expected to produce 150,000 tons, of which somewhat more than 100,000 had been mined at the time the pictures were taken. The coal is trucked to an abandoned mine track one mile away over a concrete highway.

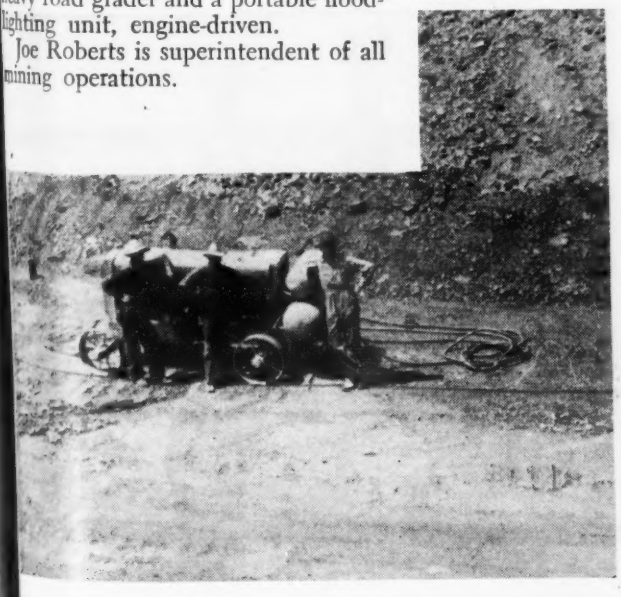
Other equipment in use at this property includes a Sullivan portable-type air compressor, two air drills, a heavy road grader and a portable flood-lighting unit, engine-driven.

Joe Roberts is superintendent of all mining operations.

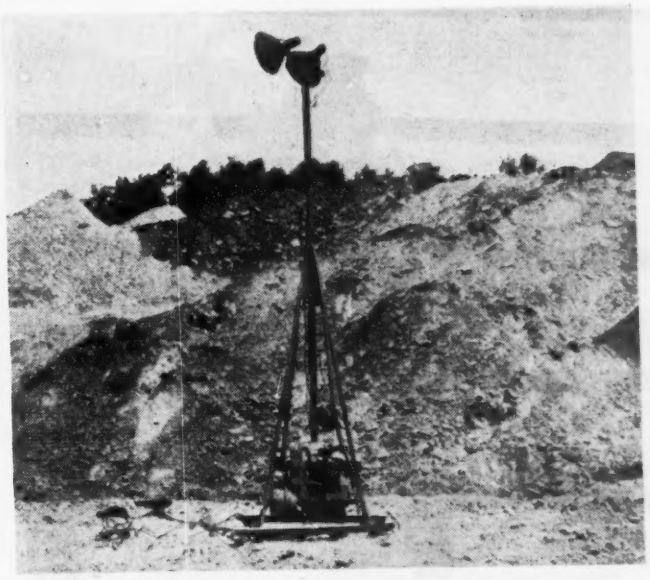


Shovel is loading from the 5-ft. vein. Overburden at the right is about 12 ft. thick.

Heavy road-patrol equipment used to grade haulage roads around the mine.



Engine-driven air compressor stationed in strip pit with drilling and shooting crew standing alongside.



Portable floodlighting equipment facilitates night operation. The engine and generator are located in the base of the lighting tower.

SAFETY COUPLING PIN

Made by Adding Flexible Rubber Handle

Finger Injuries and Shock Are Hazards in Coupling With Pins Commonly Employed—By Adding a Flexible Rubber Handle, Hazards Are Materially Reduced or Eliminated and the Coupling Job Is Eased

By J. W. SHEALY
Chief Electrical Engineer
DeBardeleben Coal Corp.
Sipsey, Ala.

ALTHOUGH improvements in safety equipment and operating methods in the last several years have mitigated the hazards of coal mining, factors inherent in a war economy have adversely affected mine safety. Among these factors are the larger percentage of inexperienced workmen, striving for greater tonnage, longer working hours, etc. To combat the detrimental effects of these developments and improve accident records, many companies have placed increasing stress on accident prevention.

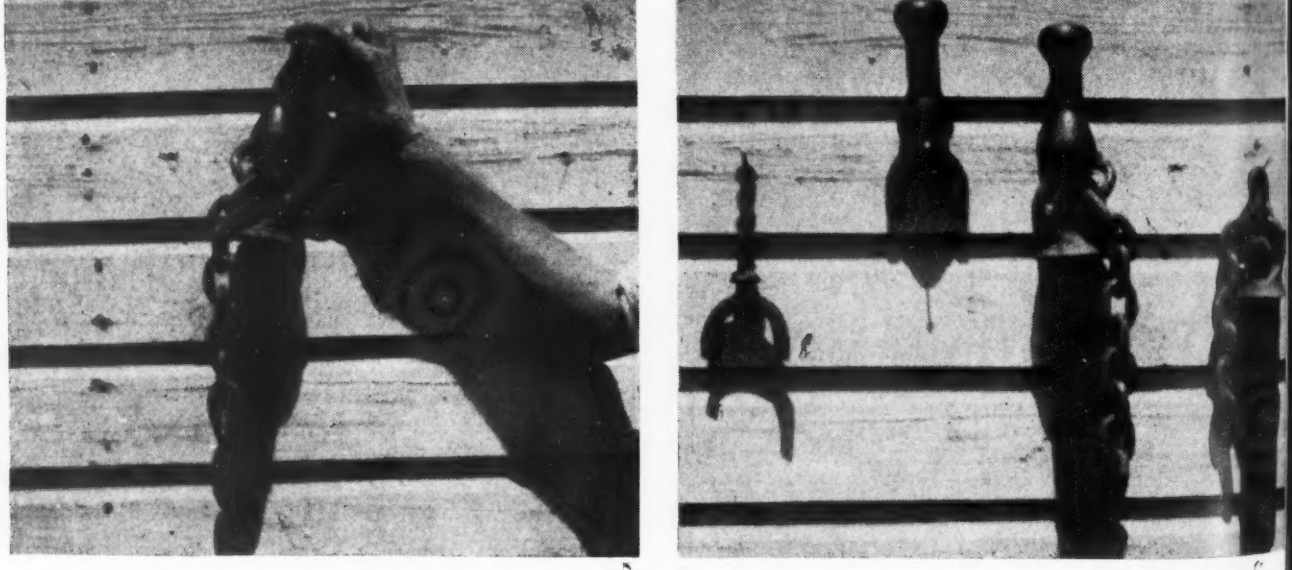
Despite the establishment of bonus incentives to foremen for good safety records, however, a close scrutiny of individual accidents and a segregation study by work classifications reveal an alarming number of mishaps in coupling mine cars, resulting in mashed and missing fingers or electric shock. Moreover, most of these injuries are to the hand manipulating the pin.

One of the most hazardous jobs in the mine is the triprider's, among whose duties—the chief concern of this article—is to couple and uncouple mine cars and locomotives. Since it is necessary for him to reach between cars in uncertain light and footing to manipulate a pin without a handle—some of which have increased in size to over 10 lb.—every consideration from the standpoint of safety and convenience should be accorded to him. The coupling operation has to be done with split-second timing. The link must be guided into the coupling with one hand and the pin inserted with the other. If the locomotive jerks before the pin is down, the top of the pin strikes against the car front or the brake levers (depending on the design of the cars and bumpers), with frequent resultant loss of fingers.

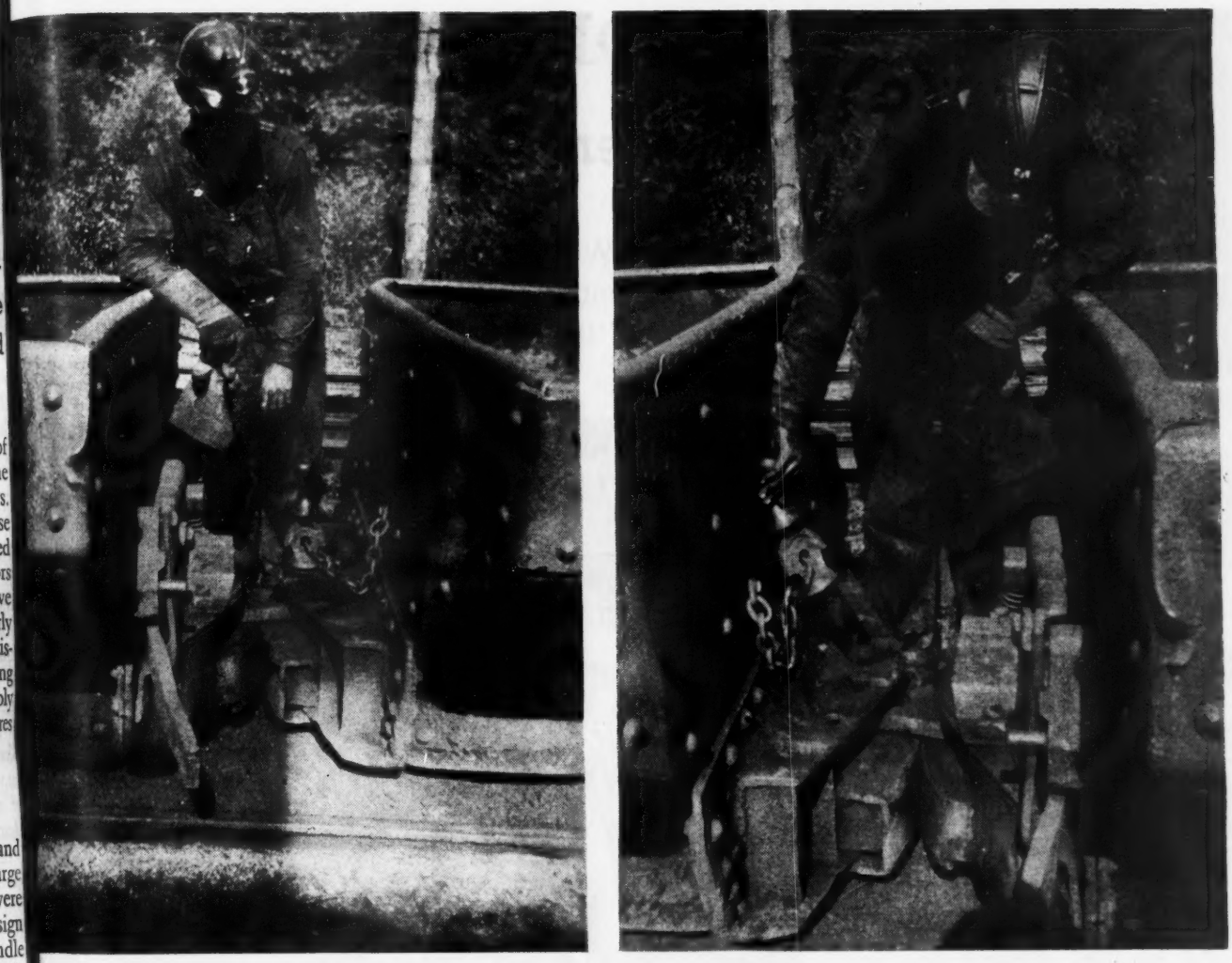
Most old-time couplers have a way of holding the pin between the thumb and forefinger, with the other fingers in the clear. Yet few experienced couplers are without mute evidence of the hazards of this operation in the shape of missing or mangled fingers. Another danger confronting these workers is electrical shock suffered when uncoupling cars from motors when the latter are on sand or have bad returns. I know of several nearly fatal accidents from this cause. In discussing the use of the safety coupling pin, various tripriders have invariably commented on the insulating features of the handle.

Cost Is Small

Briefly, the foregoing problems and conditions contributing to the large number of lost-time accidents were common when I undertook to design a safety coupling pin and a pin handle applicable to pins in general use. Only one safety pin is required for each car and its cost is small. The money consideration, however, should never be a deterrent to their adoption, as the large compensation payments saved would more than offset their cost. In



Flexibility, the outstanding feature of the handle, is illustrated at the left. Insert, rubber handle complete, pin with safety handle applied, and a pin as commonly used without the handle are shown at the right.



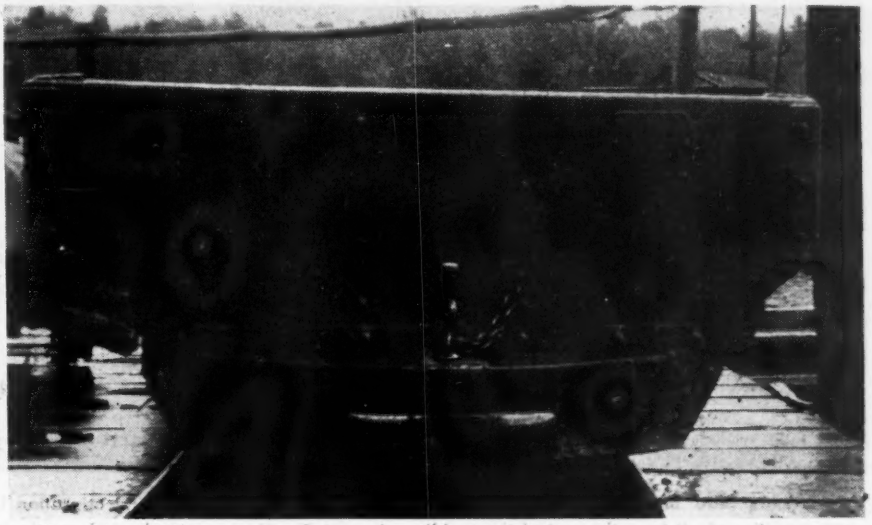
Left, safety-pin handle installed on an Empire mine car; right, where the safety handle helps. Note how top of pin kicks back when the car ahead moves forward before pin enters the bottom hole in the bumper.

ct preventing the loss of one finger ould practically pay for the total cost f equipping the cars of a small mine -aside from the humane aspect of the atter.

The simplicity and flexibility of the n handle are shown in the accom- nying illustration. The metal yoke d insert has a tough but very flexible d durable vulcanized rubber handle. he pin handle is placed over the oulder of the present pin, without terfering with the chain attachment, d the lower part of the yoke is elec- ically welded to the pin as shown. is operation takes an average of ly 2 minutes. The pin then is pped into water to prevent too much at from spreading to the molded ber.

Experience with the safety handles been highly satisfactory. Y. U. st, superintendent, Empire mine, nthusiastic about the protection y afford to the coupler, as well as convenience in use provided by handle. In one month he lost 21 s which he said could have been ided if the safety coupling pins had been installed on all the cars at his operation.

Cost of the handles as manufactured by the Manhattan Rubber Co., Passaic, N. J., is about $2.65, but, because of government priorities, deliveries have necessarily been slow. With expectation of larger supplies of rubber and curtailment of war orders, however, it is believed that the handles will be available in larger quantities before long.



Safety pin handle as installed on a Sipsey mine car.

NEW TIRE SHOP

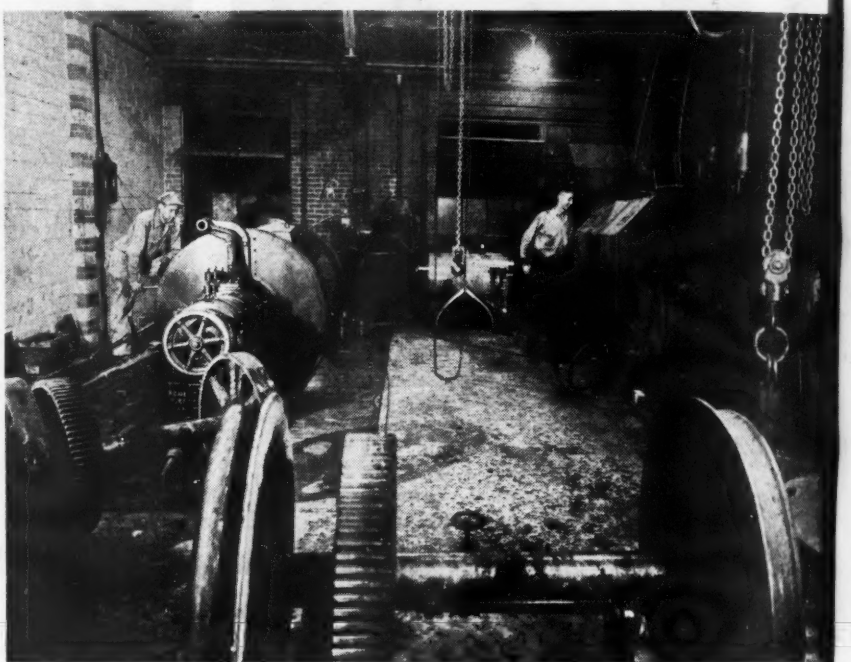
Serves 172 New River Co. Locomotives

Double-Head Automatic Welding Selected—No Tire Breakage at the Start as a Result of Waiting for a Complete Installation—Over 50-Percent Savings and Improved Locomotive Operation Expected

By J. H. EDWARDS
Associate Editor, Coal Age

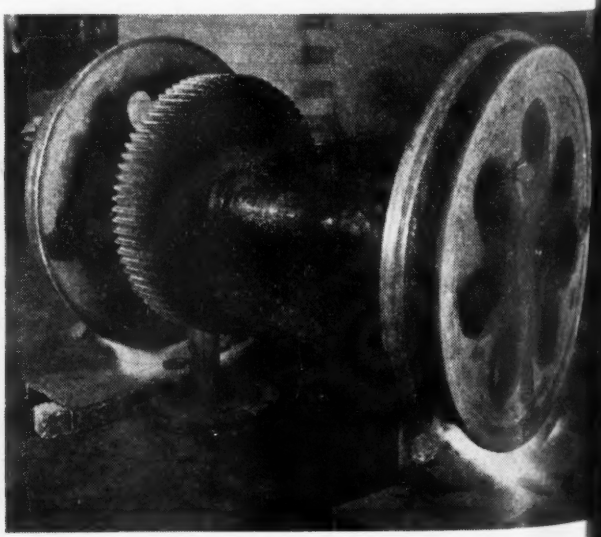
SAVINGS of at least 50 percent in mine-locomotive tire costs are expected by officials of The New River Co. from a new welding and tire-turning shop put into use in June, 1944, at the central shop at Mt. Hope, W. Va. Additional but intangible savings will result from reduced track and locomotive maintenance, fewer wrecks and greater safety through keeping the contours of tire treads and flanges closer to standard.

The New River Co. operates eleven underground mines, all in the hilly Sewell seam of the New River district in Raleigh and Fayette counties. With the exception of three rope hauls, locomotives are used for transportation. The number in use is 172, consisting of 13 types with tire sizes ranging from 24 to 36 in. In the last year, before welding was started, 842 tires were worked in the Mt. Hope shop. It is estimated that to build up that number of tires with arc welding will re-



Looking through the main door from the wheel yard—foreground, a truck on the pr heating stands; left, tire lathe; center background, welding motor-generators; rig automatic welding machine. This tire shop serves 172 locomotives at eleven operatio of The New River Co.

Open doors lead into the tire shop, established in a 25x50-ft. room partitioned off from the rest of the welding shop at The New River Co's. Mt. Hope central shop.



The first operation is placing the incoming truck on roller-top stands and starting preheating with natural-gas burners prio transfer to the welding machine.

quire approximately 21 tons of electrode.

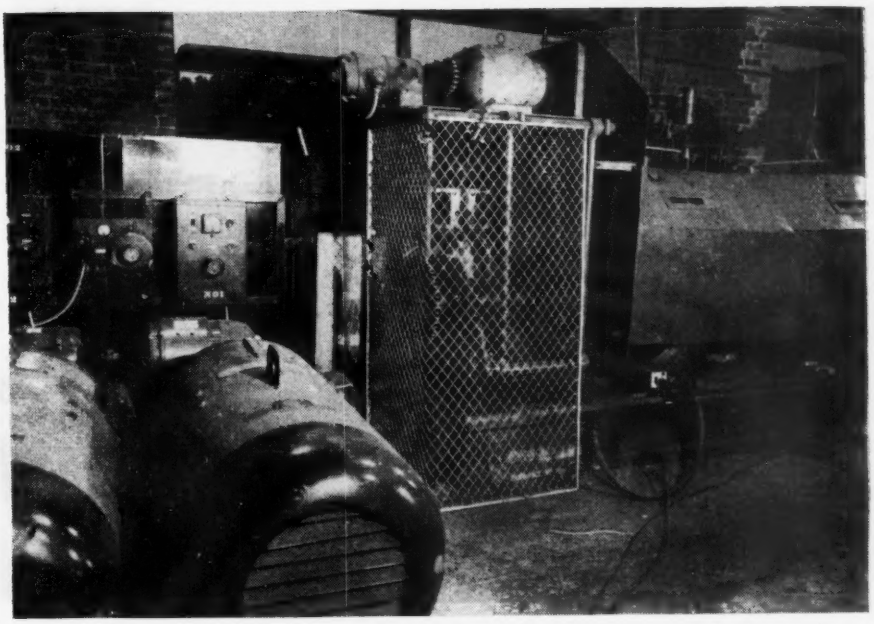
Based on personal observations, papers delivered at institute meetings and on articles in mining technical publications, officials of the company selected double-head automatic welding and at the very beginning fitted the shop with equipment for preheating, continuous heating while welding and with a heat-insulated box for slow cooling to relieve strains. Accordingly the welding was inaugurated without the breakage many shops have experienced while perfecting technique and equipment.

Equipment Facilitates Operation

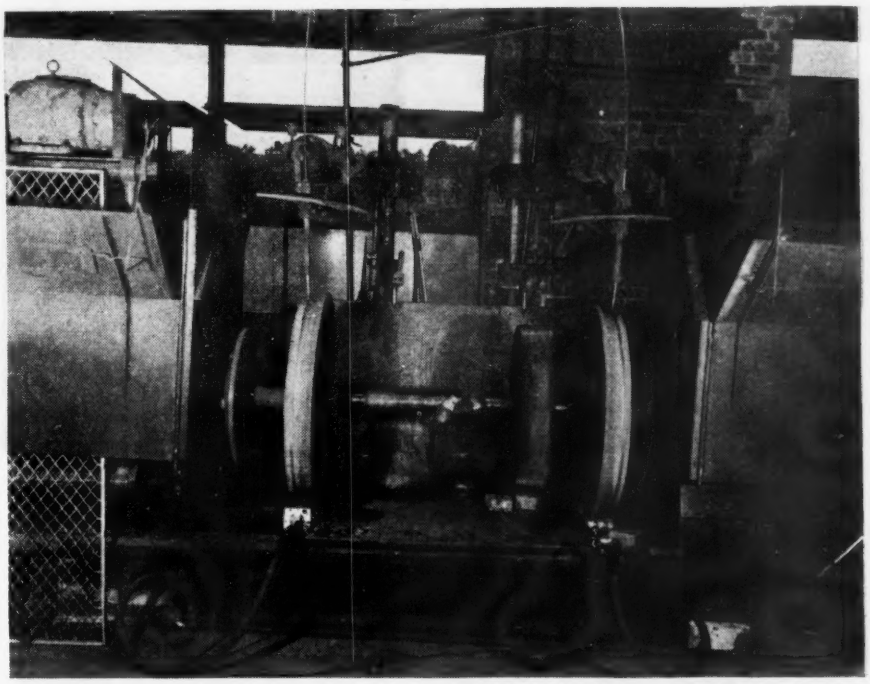
For this tire shop a 25x50-ft. room in the back end of a fairly new brick building was appropriated. This building is devoted principally to welding and the room formerly was occupied by a brass foundry that was discontinued several years ago. A 48-in. heavy-duty tire lathe formerly in the machine shop was moved to the lew location, but, in contrast to its original installation entirely above floor level, it is now placed in a 21-in. pit so that the top of the bed is level with the floor and the cutting tool is at convenient height. An I-beam trolley with 1½-ton Yale triplex chain block serves to handle the trucks in and out of both the lathe and welding machine. A man standing at the lathe faces the welding machine and so can observe its performance.

Number of Tires Worked in One Year in the Mt. Hope Shop Prior to Adopting Welding

Locomotive	Tire Diameter, Inches	No. of Tires
Jeffrey:		
20-ton	36	8
15-ton	33	20
13-ton	33	244
10-ton	30	44
6-ton SS	24	36
5-ton	26–28	220
General Electric:		
Type 820	30	4
Type 701	28	4
Type 834	24–25	60
Type 803	24–25	180
Westinghouse:		
10-ton	30	6
Type 58	30	4
Type 904C	26	12
Total		842



Welders, control equipment, variable-speed gear and lathe with automatic welding heads.

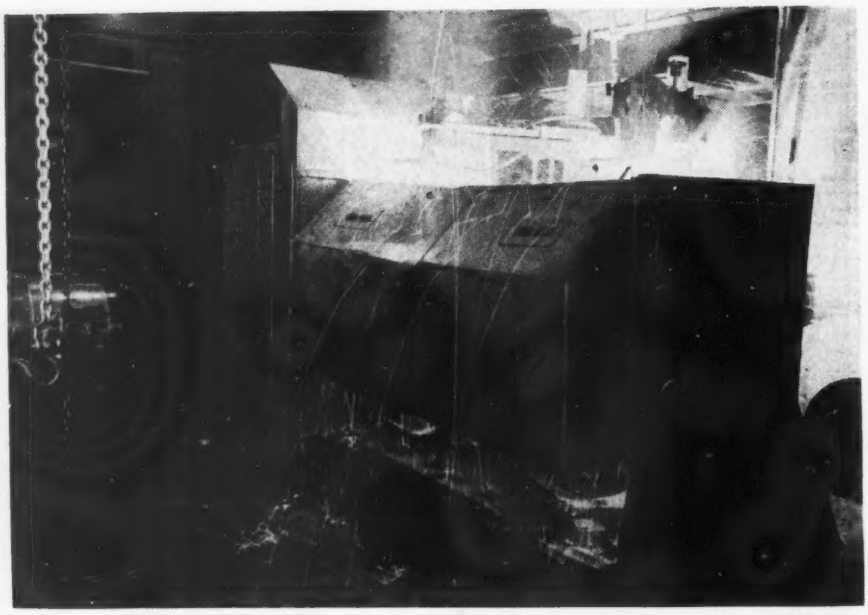


Showing, with welding machine doors open, welding heads and gas burners under tires.

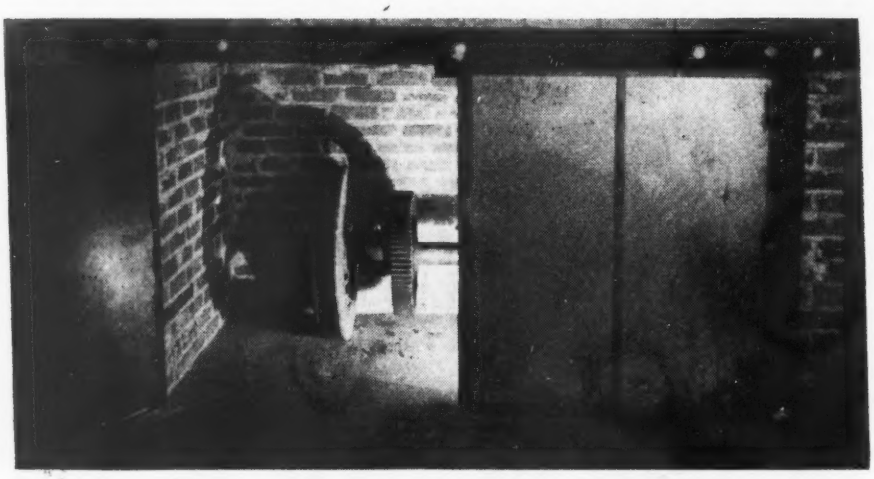
The welding machines are Westinghouse 400-amp. Flexarc motor-generator units. The welding heads with their electrical controls are of the same make and all were purchased new for this job. The welding lathe was built by The New River Co. from an old engine lathe. Its drive is a 3-hp. Westinghouse gear-motor and the mechanical connection is through roller chains and a Link-Belt PIV variable gear. As compared to belts, the chains afford a positive drive without the chance of slippage which would disturb welding adjustment. Range of peripheral speeds afforded by the variable drive is 15 to 20 in. per minute. The electrode used is ¼ in. and the speed of its feed is 19.2 in. per minute.

Cross feeds of the welding head mountings are driven through ratchets which can be adjusted to notch over as many as five times during a revolution of the tire. Usually the adjustment is two notches per revolution when welding the flange and four notches for the tread. When starting the welding of a tread the ratchet is not put into action until a bead has been applied over about three-fourths of the circumference of the tire.

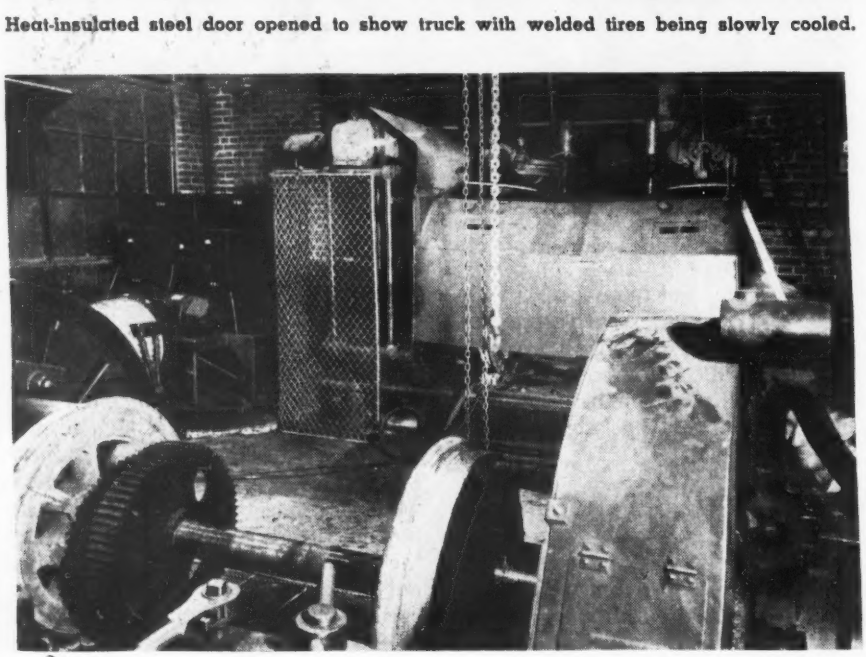
Tire wear in the mines is now being limited to a groove depth of $\frac{5}{16}$ in. below the top of the false flange. A



Welding tires two at a time, with both continuously heated by gas burners underneath.



Heat-insulated steel door opened to show truck with welded tires being slowly cooled.



The tire lathe, foreground, is directly across the room from the welding machine so that one I-beam trolley with hoist can serve both and so that the lathe operator faces the welding machine.

tire worn to approximately that extent requires four to six layers of welding on the tread and two layers on the flange. Approximately 40 minutes is required for applying one layer. A man working one shift can easily weld the two tires of a truck. While the machine is welding, the attendant can turn welded tires and do other jobs incidental to the operation of the tire shop. It is expected that normal operation will require two 8-hour shifts.

Electrode steels of 0.50–0.60 and 0.70–0.80 carbon have been tried and inasmuch as no trouble has been experienced in turning the tires welded with the harder material (0.70–0.80), it is contemplated that it will be adopted as standard. Final decision awaits service tests now under way in the mines. Welding current adjustment for the ¼-in. electrode is 350-amp.

Before being put into the machine the tires are preheated to about 550 deg. and are maintained at approximately that temperature during welding by gas burners mounted on the machine. When the welding job is done the truck is placed without delay in a slow-cooling box built with 8-in. brick walls, a 3-in. concrete top and steel doors with a thick layer of insulation. To get the trucks in and out of this box, or oven, they are rolled on the concrete floor. Eight hours is the usual time a truck is left in to cool.

Heating Done Throughout

Natural gas is the fuel for preheating and also for the continuous heating during welding. The preheatings and heatings to remove scrap tires are done on roller-topped movable stands which hold the wheels about 6 in. off the floor and allow adjustment of gas burners underneath. A pivoted cantilever crane with trolley and Coffing electric hoist serves for lifting the trucks off the incoming platform and onto the preheating stands.

It is significant that J. A. Hunt, vice president in charge of operations for The New River Co., was for a number of years president of the Lillybrook Coal Co., which about 1934 evolved and adopted a successful method of welding filler bands into tires—a practice which has saved it up to 50 percent compared to buying new tires and which practice it has continued to the present (*Coal Age*, April, 1939, p. 81). Not long after joining The New River Co., Mr. Hunt suggested that plans be made for tire welding. Slowness of delivery on the equipment held up the project until recently. C. R. Heermans is superintendent of the central shops at Mt. Hope.

"Coal-for-Victory" Judges Selected

Five Authorities Comprise Panel for Making "Coal-for-Victory" Awards—Industry Facing Real Production Task in Remaining Weeks in Meeting the 1944 Tonnage Goals

Five outstanding authorities on coal have accepted invitations to serve as judges in making the Coal Age "Coal-for-Victory" awards for increases in production and efficiency to meet scheduled requirements for coal in 1944—a race in which coal still was holding its own, although with increasing difficulty, as it went into the last critical months of the year. The judges are:

DR. R. R. SAYERS, director, U. S. Bureau of Mines, Washington, D. C.

R. Y. WILLIAMS, consulting engineer and member of the executive committee, Production Control Plan for the Anthracite Industry, Pottsville, Pa.

EDWARD STEIDLE, dean, School of Mineral Industries, Pennsylvania State College, State College, Pa.

CARL SCHOLZ, consulting mining engineer, Charleston, W. Va.

HAROLD L. WALKER, head, Department of Mining and Metallurgical Engineering, University of Illinois, Urbana, Ill.

The task of the judges will be to pass on data submitted by companies qualifying mines for one or both of the "Coal-for-Victory" awards. In this announcement, also, Coal Age reproduces the official entry blank which will be used by companies entering mines or collieries for the "War Production Efficiency" award, the "Victory Coal Production" award, or both.

Design of the emblem that Coal Age plans to make available to coal companies at cost for presentation to employees at mines or collieries winning a "Coal-for-Victory" award.

The "War Production Efficiency" award honors mines or collieries increasing output per man-shift 10 percent or more in 1944 as compared to 1943. The "Victory Coal Production" award honors properties increasing their fresh-mined production 6½ percent in 1944 over 1943. Awards to mines also carry with them awards of individual certificates to mine officials and supervisors.

Long experience and intimate acquaintance with coal mining and coal mining problems qualify the judges for their task of passing on the awards. Their careers are sketched briefly in the following:

Dr. R. R. Sayers: Senior surgeon of the U. S. Public Health Service before becoming director of the Bureau of Mines in 1940. He was educated at the University of Indiana and the University of Buffalo. He joined the Public Health Service in 1914 and for 15 years was chief surgeon and chief of the health and safety branch of the Bureau of Mines. He is the author of numerous works on carbon monoxide, high temperatures and humidities, silicosis and health and safety in mines.

R. Y. Williams: A graduate of Princeton University, Mr. Williams received his mining engineering degree from Columbia University in 1904. From 1908 to 1913, he was a mining engineer for the Bureau of Mines and since has been variously safety engineer for

The Judges

Long experience and intimate acquaintance with coal mining qualify them for their task of making the "Coal-for-Victory" awards.

U. S. Bureau of Mines

R. R. SAYERS

Nation-Wide News Service

R. Y. WILLIAMS

the Hudson Coal Co., Scranton; assistant to the vice president, Pittsburgh Coal Co., Pittsburgh; chief engineer, Weston Dodson & Co., Bethlehem; and consulting engineer with offices at Pottsville. For the past three years he has served on the Anthracite Production Control Committee.

Edward Steidle: A graduate of Penn State in mining engineering, Dean Steidle was for five years an employee of the Bureau of Mines. He served overseas in World War I, saw action in six major engagements and was wounded twice. From 1920 to 1928, he was associate professor of mining engineering at Carnegie Institute of Technology and also served as consulting mining engineer with both the Bureau of Mines and the Mine Safety Appliances Co. He went to Penn State in 1929 as the head of the then School of Mining and Metallurgy. He has organized the only mineral industries art gallery in the world, with 165 oil originals of Pennsylvania scenes, and is the author of numerous bulletins and technical papers.

Carl Scholz: Receiving his education in Europe, Mr. Scholz was a mining engineer and operator in the Kanawha district of West Virginia from 1890 to 1901. He served with the mining and fuel department of the Rock Island Ry. for 15 years and was consulting engineer for the Burlington R.R. for four years, during which he helped develop the Valier mine, which set world production records. He also was vice president and general manager of the Raleigh-Wyoming Mining Co. and a consulting engineer with the Bureau of Mines, in addition to his other activities in coal.

Harold L. Walker: Professor Walker was born at Benton, Ill., and educated at Michigan College of Mining and Technology. He has held positions with the C. B. Mautz Engineering Co., Chicago, Wilmington & Franklin Coal Co., Michigan College of Mining and Technology, Washington State College and the University of Illinois, his present connection. He is a member of the executive committee of the Illinois Mining Institute and of numerous other professional and technical societies.

With this announcement of the judges, Coal Age also reproduces the official entry blank on the last page of this announcement. Actual blanks will be mailed to all serialized mines at the end of the year. Meanwhile, careful study of the requirements now may help avoid a last-minute rush in assembling data and possible disappointment in not being able to submit entries before the deadline of Jan. 31, 1945.

Analysis of the recent trend of production reveals that coal is facing a harder and harder task in meeting the government's 691,000,000-ton goal for 1944. Among other things, wildcat strikes and work stoppages accompanying attempts to organize supervisory employees in Pennsylvania, West Virginia and Kentucky were estimated to have cost bituminous coal 302,000 tons in one week. That loss piled on some 1,000,000 tons lost over Labor Day, ate heavily into the backlog of less than 5,000,000 tons over requirements which bituminous had accumulated through August. Continuation of the stoppages into September promised still further tonnage losses, thereby making necessary extra effort in other directions to offset them. Anthracite, after falling off sharply, showed a substantial recovery late in August and early in September, although still bedeviled by wildcat strikes.

Coal is in the homestretch. A little more than ten weeks of working time remains before the final total is struck, and these ten weeks include major holidays with their prospects of substantial tonnage losses.

Coal can be proud of its record so far in 1944, but the critical weeks are still ahead. Increasing difficulties should serve to generate increasing effort. If coal is to meet the huge wartime demands that have been made upon it, every available ounce of steam must be put behind its efforts for the rest of 1944.

Blank & Stoller

CARL SCHOLZ

EDWARD STEIDLE

HAROLD L. WALKER

How Your Mine Can Win the "Coal-for-Victory" Awards

1. Any mine or colliery in the United States that has a War Production Board serial number and was open for production in the calendar years 1943 and 1944 is eligible to compete for the "War Production Efficiency Award" or the "Victory Production Award" or both.

2. The "War Production Efficiency Award" will be presented to any serialized mine or colliery otherwise qualifying that increases its fresh-mined output per manshift 10 percent or more in the calendar year 1944 as compared with the calendar year 1943. This award is intended to recognize outstanding achievement in promoting efficiency by the methods normally employed and judging shall be not alone on the results but also on how they were achieved. Mines filing for the "War Production Efficiency Award," therefore, shall supply a statement outlining how the increase in output per manshift was obtained and shall agree to supply, upon request, such additional information as may be required to permit a decision to be reached.

3. The "Victory Coal Production Award" will be presented to any serialized mine or colliery otherwise qualifying if its fresh-mined coal production in the calendar year 1944 exceeds its fresh-mined coal production in the calendar year 1943 by 6½ percent or more.

4. More than one mine or colliery operated by any one company is eligible for and may receive either or both awards if they otherwise qualify. The winning of an award, or awards, by one mine or colliery operated by a specific company shall not prevent another mine or colliery operated by the same company from also winning one or both awards if it otherwise qualifies.

5. The awards to mines or collieries will consist of certificates attesting their contribution to the war effort by exceeding 1943 calendar-year production or output per manshift by the required percentages in 1944. Individual certificates also will be awarded each member of the winning mine's or colliery's supervisory staff attesting their contribution in helping the mine or colliery to win an award or awards. Should the operating company so decide, buttons for each employee at winning mines or collieries will be made available by COAL AGE at cost.

6. Qualifications for the awards shall be judged on the basis of statements submitted by authorized officials of the companies operating the mines or collieries in question on official forms to be supplied by COAL AGE. Statements must be completely filled out and must be filed on or before Jan. 31, 1945. Postmarks shall be the guide in judging acceptability under this restriction.

7. COAL AGE reserves the right to request from appropriate government or other statistical agencies certification of production and other figures submitted by coal companies filing for an award or awards, and such companies shall agree that statements are submitted subject to such certification.

8. A board of judges nominated by COAL AGE shall be the sole judges of the qualifications for awards and coal companies filing for the awards shall agree that their decision shall be final.

9. Realizing that changes arising out of the course of the war might materially alter conditions, COAL AGE reserves the right, if it should appear to be necessary, to modify the terms and conditions of the awards or adopt new terms and conditions, to the extent necessary to permit giving proper recognition for meritorious work in supporting the war effort.

10. Announcement of the awards will be made as soon as practicable after the final date for filing.

"COAL-FOR-VICTORY" AWARDS
Official Entry

Please read carefully before filling out. Use a separate form for each mine entered. Information supplied herein is for judging purposes only and otherwise will be held confidential. If desired, points may be amplified or information covering special conditions may be supplied for consideration by the judges on supplementary sheets or in covering letters.

IMPORTANT: This entry, completely filled out, must be mailed not later than Jan. 31, 1945, as shown by the postmark, to: Editorial Department, COAL AGE, 330 West 42d St., New York 18, N. Y.

Name of coal company _____

Name of mine or colliery _____ W. P. B. Serial No. _____

Address of mine or colliery _____

TO COAL AGE: The above operation was open for coal production in 1943 and 1944. Please enter it for the following "Coal-for-Victory awards" (check one or both):

☐ **"War-Production-Efficiency" award (for an increase of 10 percent or more in output per man-shift worked in 1944 as compared to 1943).**

☐ **"Victory-Coal-Production" award (for an increase of 6½ percent or more in coal production in 1944 over 1943).**

OUR FRESH-MINED PRODUCTION AND MAN-SHIFTS WORKED AT THIS OPERATION WERE: (Please fill out completely as otherwise entry cannot be considered. Note: If only the "Victory-Coal-Production" award is being applied for, data on man-shifts worked need not be supplied):

Yearly Production, Tons	**Total Man-Shifts Worked by ALL Men Customarily Charged to the Mine Payroll**
1942 _____	
1943 _____	1943 _____
1944 _____	1944 _____

WE ATTAINED OUR INCREASED OUTPUT PER MAN-SHIFT BY THE FOLLOWING METHODS: (To be filled out by briefly stating methods employed—better management, mechanization, etc.—only when "War-Production Efficiency" award is being applied for. If additional space is necessary, please use separate sheet):

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DO NOT WRITE IN THIS SPACE

In submitting this entry under the rules governing the "Coal-for-Victory" awards, I, as an official of the company operating the above mine or colliery, declare and agree for the company: (1) that the statements made in the preceding are correct to the best of our knowledge and belief; (2) that COAL AGE and the judges may, if they feel it necessary, request additional clarifying data in any reasonable amount; (3) that COAL AGE and the judges may request from government or other statistical agencies certification of the production and other figures submitted; (4) that we will abide by the rules and the decision of the judges.

Signature..... Title..... Date .....

HOW COAL COMPANIES WILL FILE FOR "COAL-FOR-VICTORY" AWARDS—Copies of this entry blank will be mailed at the end of the year to all coal companies operating serialized mines or collieries. Entries must be filed on or before Jan. 31, 1945, and will serve as the basis for the awards.

HIGH LOADER OUTPUT

Reflects Equipment and Methods at Saxton

Record Machine Loading and Expanding Production Follow Adherence to Principles — Good Track and Engineering Insure High Efficiency — Shop Methods and Good Tools Promote Maintenance

DRY FIGURES are exciting when they boost one's bank account. Coal these days means money—and Victory. A 4½- to 10-percent annual increase in daily output for the years 1941 to 1944 is a record to attract notice, along with the methods employed to achieve it.

The Saxton mine of Walter Bledsoe & Co., Terre Haute, Ind., has been in operation 23 years. There has been no increase in mining equipment during the period 1941-1944, and only minor substitutions. Many of the miners have been employed the entire life of the mine, making 49 years the average age at the present time.

The daily average railroad-car loadings have increased consistently year by year, the increase being 10, 4½ and 6.9 percent for the years 1941-44. The actual figures in tons per day are:

1941	.....	2,715
1942	.....	2,985
1943	.....	3,119
1944	(four months)	3,334

By FRED W. RICHART
Assistant Editor, Coal Age

Monthly mine loading records for 1944 also supply some interesting data. The complete report for January indicates the average cars per day per loading machine and the uniformity of car weights. The summary for the first four months of the year confirms this uniformity over several months and points up the steady increase in loading-machine output.

Production per man-day in the first four months of 1944, counting all employees, comes out at approximately 10.5 tons. This makes the yearly rate per man on the basis of the first four months of 1944 approximately 3,180 tons. The national yearly rate per man in 1943 for bituminous coal is estimated at approximately 1,400 tons. During this four-month period the mine worked 101 of the possible 103 working days.

Record loading for one machine for one day at the time this article was prepared was made by Wallace Rippy, April 1, 1944, with machine No. 11. This record was 806.4 tons for the actual working time of 7½ hours, or at the rate of 107.51 tons per hour. It was made with one gathering locomotive, required 280 car changes and was just 1,800 lb. over a previous similar recrod.

Coal recovery at Saxton is just under 60 percent of the vein content.

Engineering Control

The engineering approach to the problems of Saxton mine perhaps has more to do with the production figures than has the particular equipment used. However, equipment that fits mine conditions is essential for maximum results. The necessary time studies have been made to design the

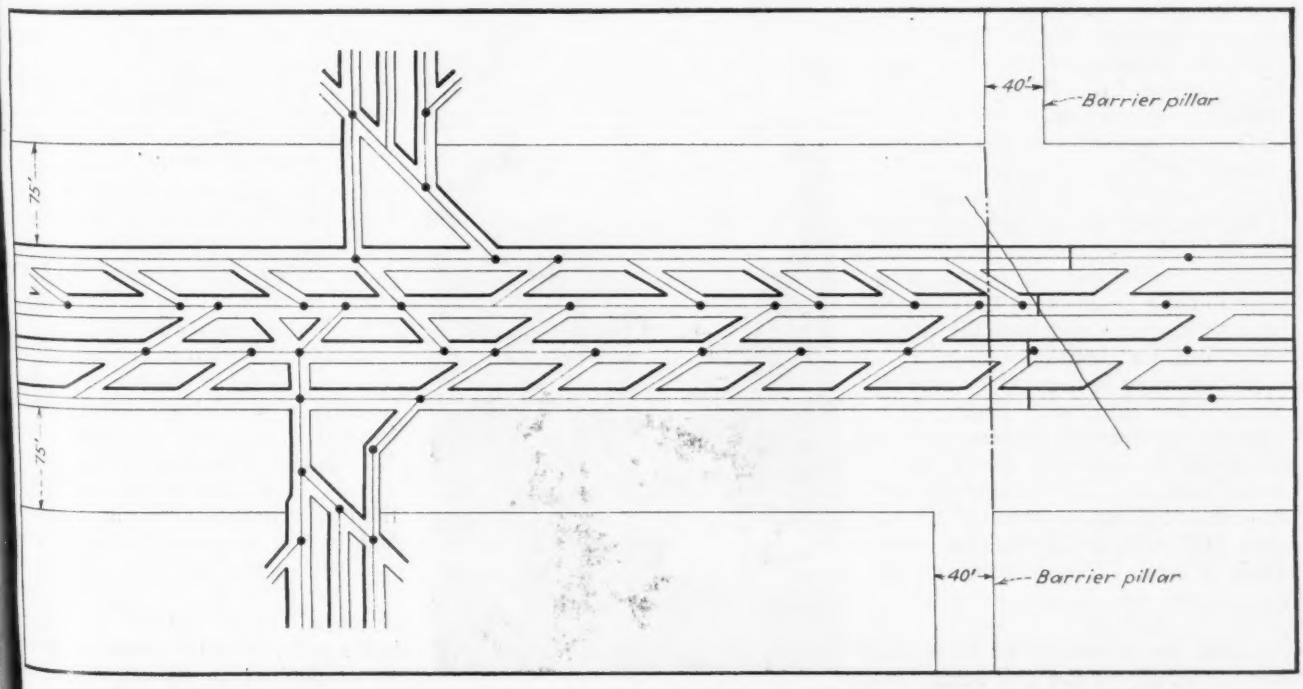


Fig. 1—Plan of main entry layout, showing how working panel is turned off; maximum entry width, 14 ft.

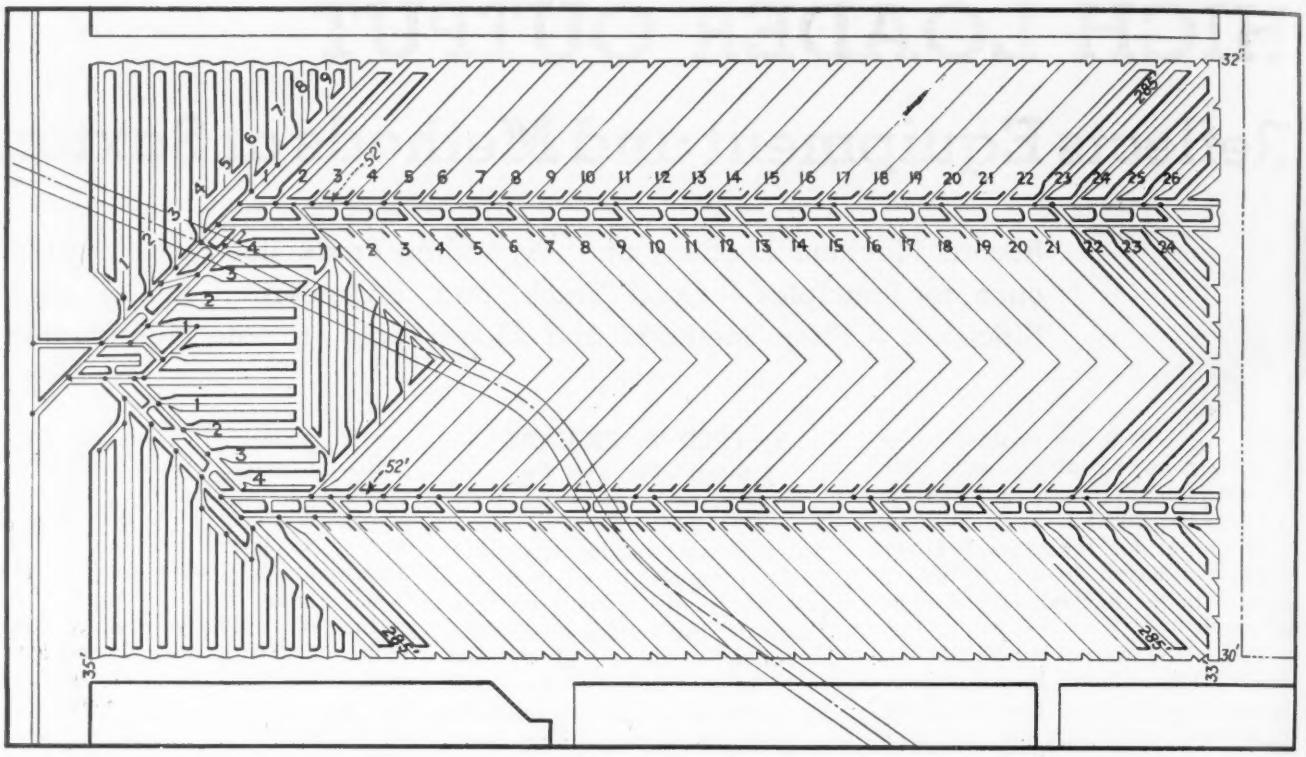


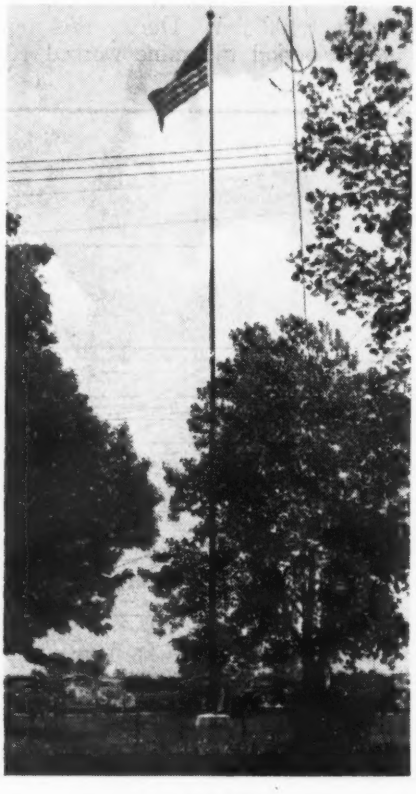
Fig. 2—Working panel. All panels are similar. Note heavy pillar to protect mouth of straightway entries.

mine layout and to operate the equipment to the best advantage. That has been followed by such changes as experience indicates will improve product and increase production. Management is alert to give its equipment a chance to do its best, planning that tomorrow may bring another record.

Every entry, crosscut and working place is laid out on paper in advance, with dimensions and angles indicated. Every working panel is completely mapped before the initial cut is made, even to locating the bulkhead that closes the workings when mined out. No deviation from the plans is permitted except in case of a fault across an entry. In that case the engineer directs the change. Sights never lag more than 125 ft. on the theory that if they are not near the face they may not be used. The accompanying illustrations show how the four-heading main entry is driven, how the working panels are mined and how the rooms are drilled for shooting.

Saxton mine is overlaid in part by a gravel bed filled with water. It is necessary to prevent squeezes and to know the conditions in nearby abandoned workings. For making the latter tests, a Sullivan air-driven diamond core drill with a 200-ft. horizontal reach is used. The motor-driven air compressor to furnish non-electric power to the drill is set up and operated on a current of fresh air, compressed air for the drill being supplied through a hose line. When approaching an area where worked-out rooms are "head on," the drill is set diagonally so it will not dead-end in a pillar.

When mined out, every panel is sealed with a concrete bulkhead 6 to 10 ft. thick, arched against the pressure as indicated in Fig. 3. The bulkhead walls are filled with shovels as far as possible and finished with an air-pressure concreting machine.

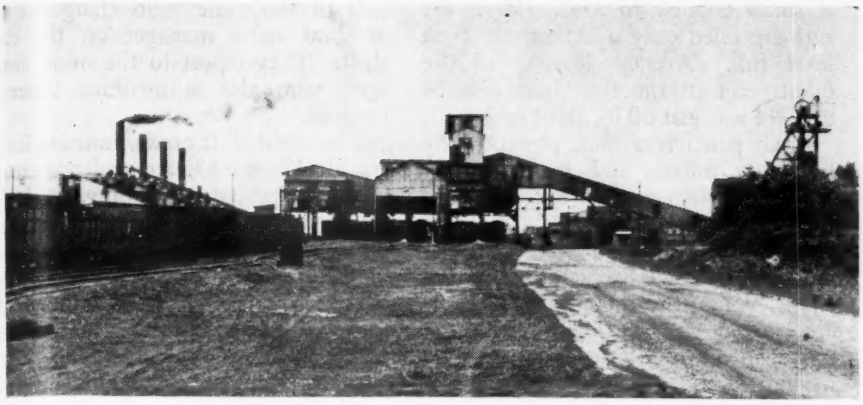


Flag of victory.

The engineering department also looks after transportation, coal preparation and the design and erection of new buildings. It keeps a file of information that will answer almost any question relative to the physical condition or the operation of the mine. It maintains production records and posts machine loadings at the end of the day. The mine map is brought up to date every month.

A major job of heavy entry grading was nearing completion when this article was written. Total length is about 2,500 ft. While reducing the maximum grade in favor of the loads from 14 to 3.73 percent, it levels off the hilly haul to a more nearly uniform grade. The project required a cut of over 9 ft. and a fill of about 6 ft., both in hard shale.

Good ventilation is assured by various measures, including the four-heading main entries, two headings for intake and two for return. The fan delivers 52,000 c.f.m. at a water gage of 3½ in. To reduce roof falls in the intake aircourse, this air is humidified in the summer season by automatically controlled water sprays set just ahead of the fan intake. The beneficial effect extends for about half a mile, or to the point where the air would become saturated from the moisture in the mine.



Saxton hoisting shaft, tipple and loading yard.

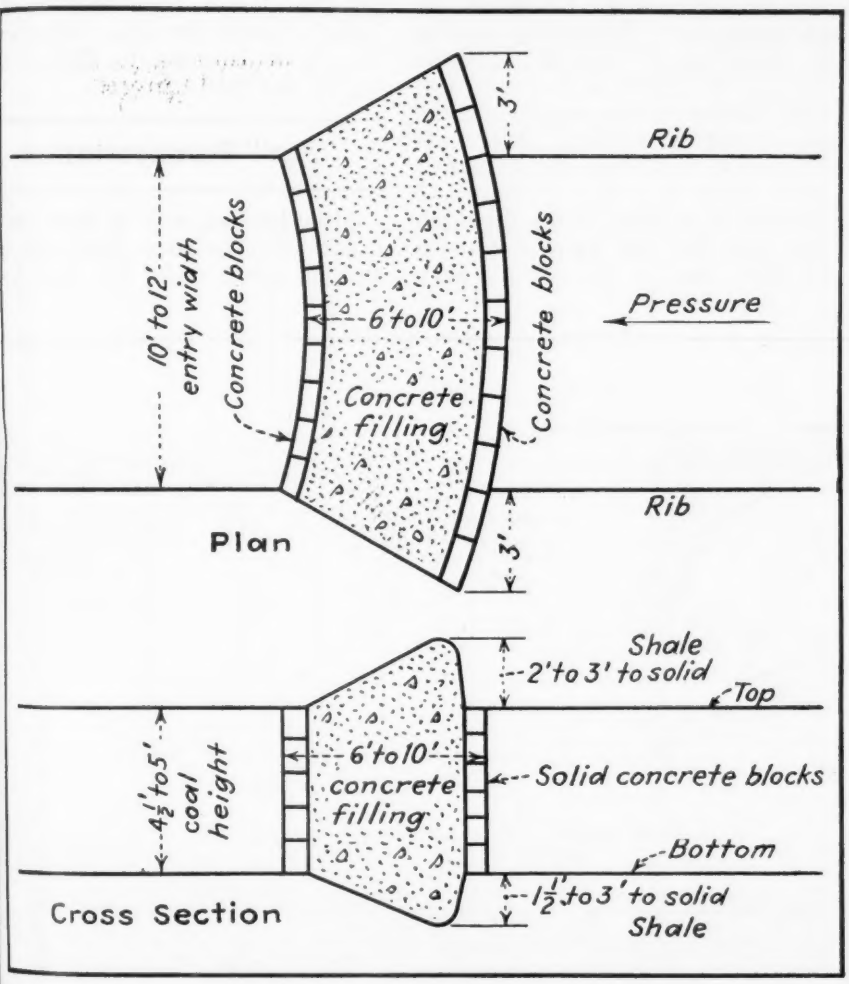


Fig. 3—Plan and vertical cross-section of bulkhead to seal worked-out panels. It is arched against possible water pressure.

Big Loader Tonnage

When queried as to the reason for the loading record at Saxton, the engineering department replied: "The secret is good track."

Room track of 40-lb. steel, laid with steel ties on a smooth floor, and 45-deg. rooms and crosscuts, permit car changing at top speed. The herringbone layout of the rooms and the use of every third room as a key working place makes possible long, easy curves and short car movement in gathering—two essentials for a quick car change. Crosscuts from the key room are turned with one 45 deg. to the right, the other 45 deg. to the left. Results at Saxton prove the value of this plan.

But there are additional reasons for these records. The cutting and loading machines, drilling and shooting, quick acceleration of locomotives, live crews and progressive management combine to make record loading a habit. It is pointed out that moderate-capacity light-weight wooden mine cars have certain advantages over heavy steel cars of large capacity. In the rare event of derailment on good track, they are easily rerailed.

Rooms are cut on the bottom and sheared near the center. There are two reasons for shearing: reduced powder cost and a large percentage of lump coal. Jeffrey star bits are used in a ten-position arrangement to cut a 6-in. kerf. Worn bits are tipped with Stoodite and are used five or six times before being discarded. Jeffrey cutting machines have 9-ft. cutter bars and all are used to capacity daily. Goodman cutting machines handle the remainder of the cutting load. The Goodmans have 7½-ft. cutter bars, but do not shear.

A normally operated cutting machine does not quite keep ahead of a normally operated loading machine. The ratio is about ten cutting units per day to 8½ loading units a day. The night shift makes up the day-shift shortage in cutting. The driller and duster drill the holes, two on each side of the shearing cut in the rooms, fill the tamping bags and set them in a convenient place for the shotfirer.

The shotfirer enters the mine at 9:00 in the morning, gets his supply of powder (du Pont Lump Coal C permissible) from one storage station and the blasting caps from another. The caps are carried in an insulated wooden box. The shotfirer puts in the day loading and tamping holes, always leaving the primer wires shorted until the shift men are out of the mine and until actual blasting is done.

Shots are fired individually and, therefore, no question arises as to whether a shot has been fired. To reduce trips into the room between shots, the shotfirer uses two cables, each attached to one primer. The two shots are fired separately and the shotfirer reenters the room to wire up the second two shots. The firing is with an electric blasting machine.

The normal method of setting cars under the loading machine is for the cable-reel gathering locomotive to pick up a trip of four empties and switch the front car under the loader. When filled it is switched to the nearest siding and the second car pushed under. This process is repeated until the four cars are loaded and disposed of. The locomotive then picks up another four empties and repeats.

Of the five men directly engaged in loading, two are runners who alternately operate the loader and supervise filling the car. The remaining three are the motorman, who never

leaves the locomotive; the triprider, who stands at the switch to direct car and trip movements, and the blocker, who assembles the loads for relay locomotives. During the car change, the runner busies himself cleaning up scattered coal and filling the loader conveyors.

All relay locomotives are equipped with cable reels. When loads are delivered to the parting, they return to the working panel with a new supply of empties.

All of the 500 mine cars have solid-box bodies, most of them wood. They are fitted with 14-in. Timken roller-bearing wheels, 30-in. wheelbase, 42-in. gage, and weigh about 2,000 lb. The inside body dimensions are 10 ft. x 4 ft. 9 in., with an average depth of about 2 ft. 4 in. The height from the top of the rail is 43 in. The loading end is dropped approximately 12 in. to make room for the loader conveyor.

Because of the difficulty of handling large lumps in the low section of the mine, the coal is shot harder to break it small enough to load. Here the cars are filled only a little more than level full. Average loading in the 60-in. coal in the first four months of 1944 was just 60 lb. short of 3 tons.

Each panel is a unit, protected by boundary pillars, and is completely sealed off when worked out. It comprises two pairs of entries with rooms turned off each entry. A loading machine is assigned to each pair of entries. When the rooms of one entry are worked out, the loading machine moves into the other entry, and when its half of the panel is worked out it moves to a new panel.

The usual production set-up consists of two crews of 17 men each in one panel, and a third similar crew in a second panel. The first crew to work out its area in the two-unit panel then transfers to the panel where the single unit is working. When its companion crew works out its area, it moves into a new panel. Crews 1, 2 and 3 work in 60-in. coal in the north section of the mine; Crews 4, 5 and 6 in 54-in. coal in the south. Each half of the mine is in charge of an assistant mine manager on the day shift. They report to the mine manager, who also is assistant superintendent.

The night-shift crews, running loaders 11, 12 and 13, are skeleton crews for development work only. A loading crew is made up of a runner, motorman and triprider. The working unit has a boss, just as a day crew. The coal loaded by the night shift is limited by the number of empty mine cars available, since there is no hoisting on the night shift.

At the end of the hoisting shift, average car weights and total tonnage for each loader are posted on the bulletin board for crew inspection. This is an incentive to efficient car loading and total tonnage.

"Par" Transportation

Mine haulage, with its heavy rails, treated ties, ballasted track and increasing speeds under the control of

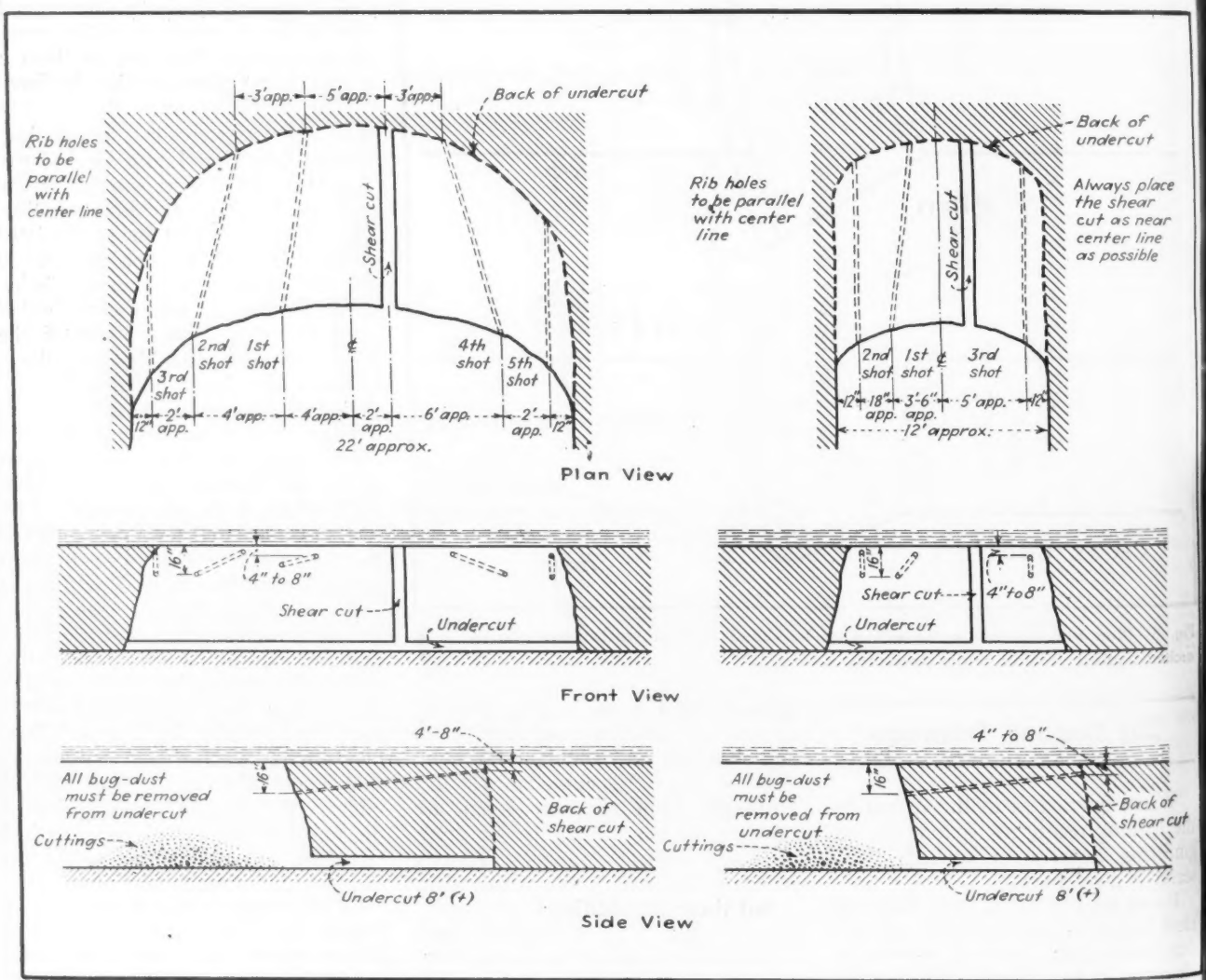


Fig. 4—Standard method of drilling and shooting working places.

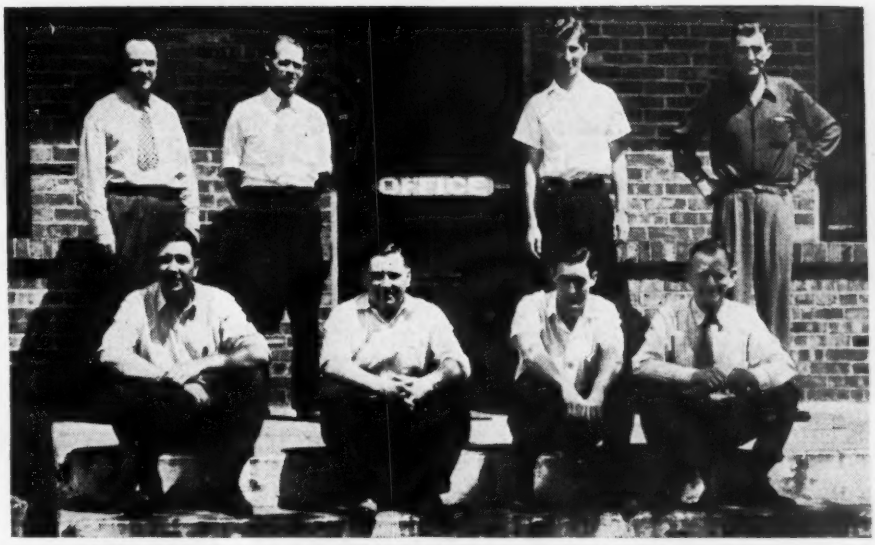
dispatchers is fast approaching railroading. Saxton main-line haulage possesses all these features plus easy grades, long curves, double-bonded rails and 6/0 trolley. A pay load of 10,000 ton-miles a day, with extremely few derailments, is the result.

Haulage from the room assembly to the hoisting shaft is in two stages. Relay locomotives pick up the assembled loads in the working panels and haul them to the partings, where main-line trains are made up. Six-, 8- and 10-ton locomotives handles this work. From the partings, 13- and 15-ton locomotives haul the 2½- and 3-mile distances to the hoisting shaft. Trolley shoes are used in this heavy duty.

At the hoisting shaft cars are dumped by an air-operated rotary dumper into the bin that feeds into the counterbalanced skip holding approximately 6 tons. Mine cars are coupled by three links which provide enough slack to permit rotating them 135 deg. and reversing without uncoupling.

Main-line track is built around 60-lb. rails laid on 4x7-in.x6-ft. sawed ties treated with zinc chloride and spaced on 2-ft. centers. This track has three features which contribute to the speed, safety and efficiency of haulage. The entire length is ballasted with gravel; curves, with one exception, have a minimum radius of 150 ft., and every joint is double-bonded.

Another feature contributing to good working voltage for haulage and face operations is the use of 3-in. and 6-in. pump discharge pipes as auxiliary returns. By bonding these pipes to the rails at frequent intervals, the resistance of the return conductor is materially decreased. This installation has given no indication of trouble from electrolysis. The electrical engineer suggests that it is much better to weld the bonds to the sleeve of the pipe line than to the pipe. It makes a better job.



Management and office personnel Saxton mine; standing (left to right), Birch Brooks, Joseph Auberry, Warren Wilson, H. C. Bean; seated, C. B. Burk, Harry Nichols, Curt Owens, Job Anderson.

Preparation

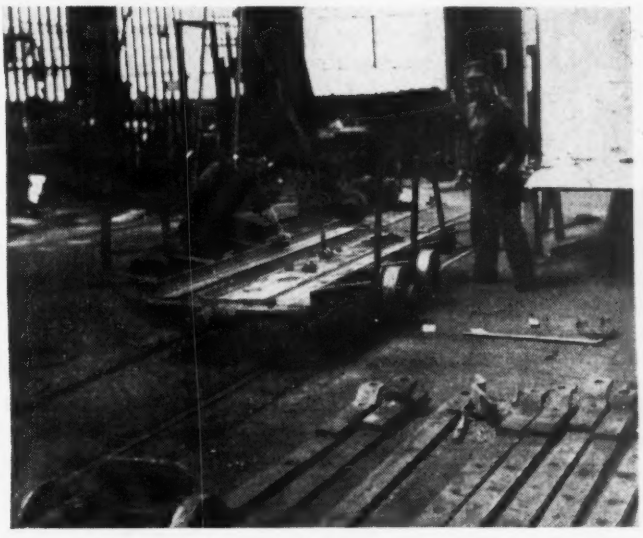
Coal is dumped from the skip into a bin from which it is fed uniformly to a 36-in. belt which conveys it to the screens in the tipple.

The screening plant is set up to produce 23 sizes of coal, ranging from 6-in. lump to ⅜-in. screenings. These include the customary sizes of lump, egg, nut, stoker and screenings. When required, several other grades may be made from assembled mixtures. All prepared coal is loaded directly into cars under the seven-track tipple.

Saxton coal is Indiana No. 4 vein, 4½ to 5- ft. thick with a streak of bone coal averaging 1½ in. 20 in. from the floor. Roof and floor are hard shale. The bone coal is hand-picked from the egg and lump sizes by four men for egg and three for lump. In other respects this coal does not require further cleaning before marketing.

The hand-picked refuse, approximately 3½ percent of the total output, is crushed to 3 in. and conveyed to a storage bin. As needed, it is drawn from the bin and hauled in small rail cars to the boiler plant for fuel. This refuse produces all the power for the mine, being hand-fired into four 630-hp. Babcock & Wilcox water-tube boilers.

Hot coffee at noontime provides added pep and keeps coal moving quickly to the hoist all afternoon.



Rebuilding a mine car. This car will leave the shop in virtually new condition.

New haulage track under construction, showing 9-ft. cut in the floor. The bottom of the coal is 3 ft. above the heads of Birch Brooks, H. C. Bean, Fred Hayes and John Stevenson.

Section of the new haulage road where the top has been brushed and a fill is being made for the track (heavy rails, treated ties and ballast) on a main line.

Power a Byproduct

As to fuel, steam and electric power at this mine are byproducts, absorbing the cost of refuse disposal. This power plant was originally laid out as part of a chemical works, so it differs from the usual coal-mining power plant. For that reason there is some duplication of equipment the average mine power plant is not ordinarily blessed with.

Two points of difference are the considerable distance from boilers to generating room and the use of 480-volt generators. The latter make a transformer station necessary to step the voltage up to 2,300 for transmission into the mine.

The boiler plant, as stated, consists of four Babcock & Wilcox 630-hp. water-tube boilers with hand-fired shaking grates. The steam pressure is carried at 150 lb. per square inch. The present ash-handling method will soon be replaced by mechanical means.

Steam for the power plant is carried by a long well-insulated pipe line to supply pumps, air compressors and steam-driven generators. In addition to electric power, the plant furnishes compressed air for operating four air-lifts to pump the water supply from an underlying gravel bed, and for operating the rotary car dump at the shaft bottom. The entire water supply for the mine is pumped by the plant.

Boiler feed water is heated by engine exhaust and pumped to the boiler plant at a pressure of 200 lb. through an insulated pipeline on the same supports that carry the steam line.

A water-treatment plant using soda ash, iron and lime treats the boiler water for the main steam plant and for the heating plant in the office group of buildings. Raw water, pumped through separate mains, is used for drinking and bath.

Steam for the double-cylinder reversible geared Vulcan hoist is piped directly to the hoist room. The skip and its counterbalance weight are each swung by 1½-in. steel rope. The record hoist is 3,725 tons in a shift. It is believed that the total can be increased to 4,000 tons.

The fan also is driven by steam.

A.c. power is carried down a borehole by one 3-conductor wire-armored cable and down the hoisting shaft by a similar cable. This duplex supply line normally is operated in parallel. Power is carried inside the mine by steel-ribbon-shielded parkway cables to the substations near the working faces. Parkway cables are supported from the roof on steel mes-

Table I—Loading-Machine Operation, January, 1944

Machine	Runner	Cars per Shift	Av. Wt. (100 lb.)	Tons per Shift	Total Cars Rock
1	Crampe	164	60.1	492	17
2	Darrough	147	59.0	434	71
3	Brown	158	60.0	474	35
4	Myles	140	53.5	374	6
5	Campbell	171	53.7	459	4
6	Abbott	149	50.6	376	12
11	Rippy	121	56.1	339	141
12	Chadwick	115	51.6	296	39
13	Smith	87*	51.8	226	18
Per hoist shift		1,221	55.6	3,391	325

Hoisted, 25 shifts. Day machine average, 435 tons per day. Machines 1 to 6 load on the day shift in rooms, the first three in 60-in. coal and the second three in 54-in. coal. Machines 11 to 13 load during the night shift in development work with skeleton crews. Their tonnage is limited by the number of empty cars available for loading.

* Part crew.

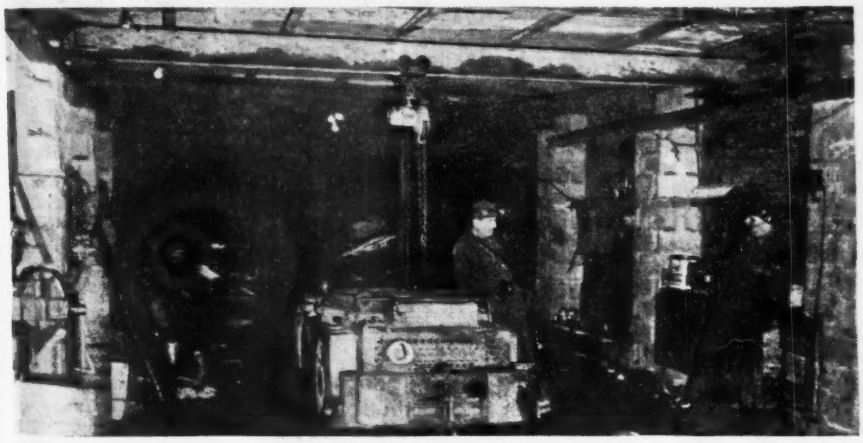
Table II—Loading-Machine Results for the First Four Months 1944, Saxton Mine

Month	Days Hoisted	Mine Cars Hoisted Per Shift	Mine Cars Loaded Mach. Shift	Mine Cars Loaded Avg. Wt.	Average Tons Mach. Shift	Average Tons Day Shift	Average Tons Hoisted
January	25	1,221	141	55.6	391	435	3,391
February	25	1,210	146	55.8	408	440	3,378
March	27	1,247	149	56.1	417	446	3,494
April	24	1,249	150	56.0	420	446	3,498

Table III—Production-Unit Personnel at Saxton Mine

1 Cutting-machine operator.
1 Cutting-machine helper.
1 Driller.
1 Duster.
2 Loading-machine operators, one at tail end.
1 Motorman (cable-reel locomotive).
1 Triprider, stationed at the switch.
1 Blocker, couples the loaded cars.
3 Tracklayers.
1 Timberman.
1 Relay motorman.
1 Relay triprider.
1 Electrician.
1 Foreman.

These 17-man crews averaged 446 tons per day in the first four months of 1944, half in 60-in. coal and half in 54-in. coal. Shotfirers are not included.



"First-aid" station for ailing equipment. Plenty of room, a chain hoist, tools and parts at hand cure many minor ailments.

senger cables located on the left side of the entry, entering the mine, and are sectionalized by oil circuit breakers to isolate faults and promote good service.

Power conversion from a.c. to d.c. is by motor-generator sets and rotary converters. All but one of these are equipped with automatic reclosing d.c. circuit breakers for promptly restoring interrupted service. D.c. power is carried by 6/0 trolley supplemented by 600,000- and 700,000-cir.mil insulated feeders along the right side of the entry. The feeders are supported on spool-shaped porcelain insulators in stirrup hangers from the roof or by pins driven into the rib.

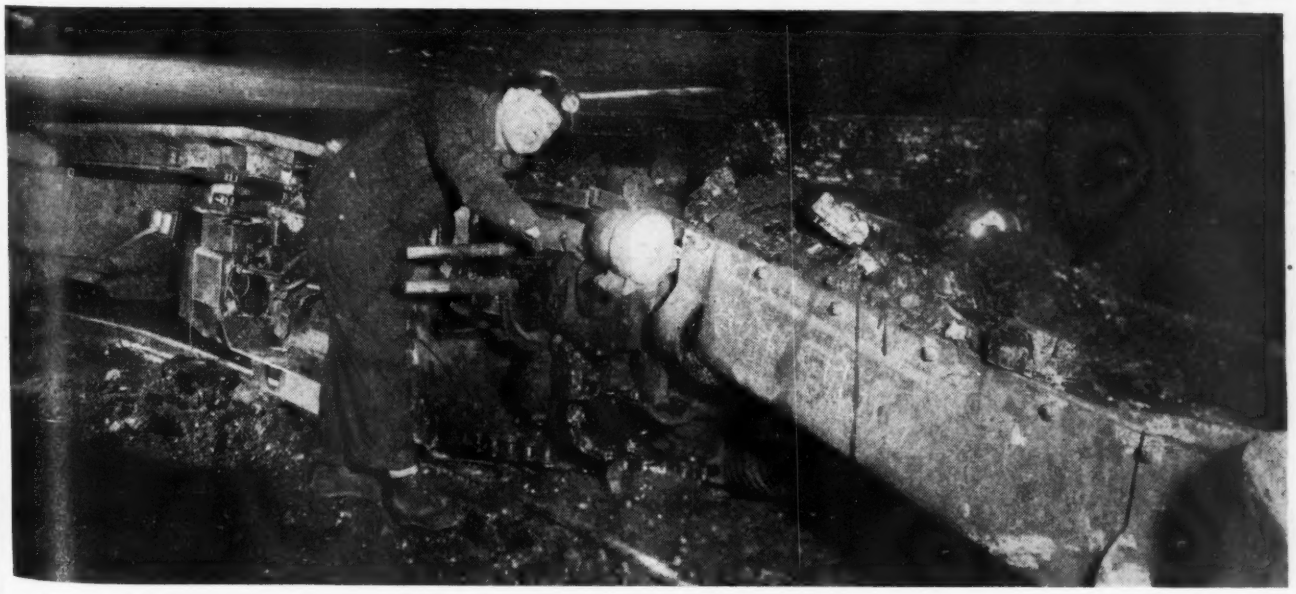
Substations are kept up to within 4,000 ft. of the working faces. For most operations that means not over 1,500 to 2,000 ft. The voltage at the face seldom falls below 225.

Maintenance for Production

"Tooling the shop is the beginning of maintenance. Without accurate tools it is impossible to do accurate work." So states the shop foreman.

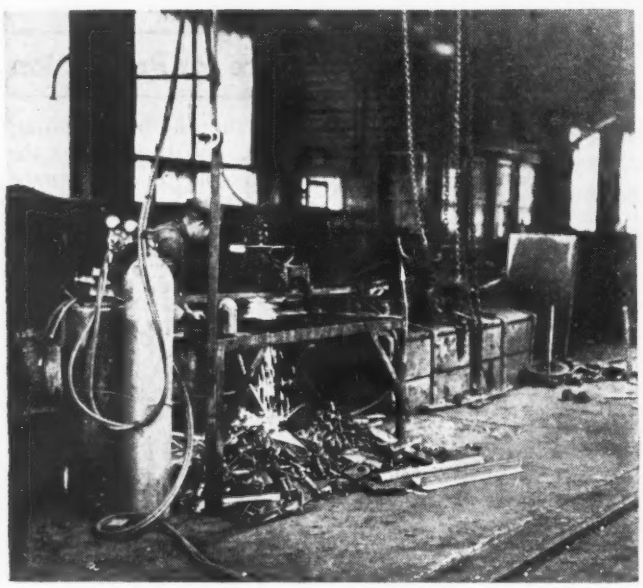
The problem of maintenance has a front seat at Saxton mine. The three-stage set-up is a bit different from the normal maintenance program. It comprises two "first-aid" stations near the working faces, one in each section of the mine; one repair shop at the man-and-material shaft and a much larger shop near the hoisting shaft. The latter shop was originally built for the chemical works, but it also has certain advantages in the mine set-up.

The "first-aid" shops are temporary affairs and new ones are fitted up near

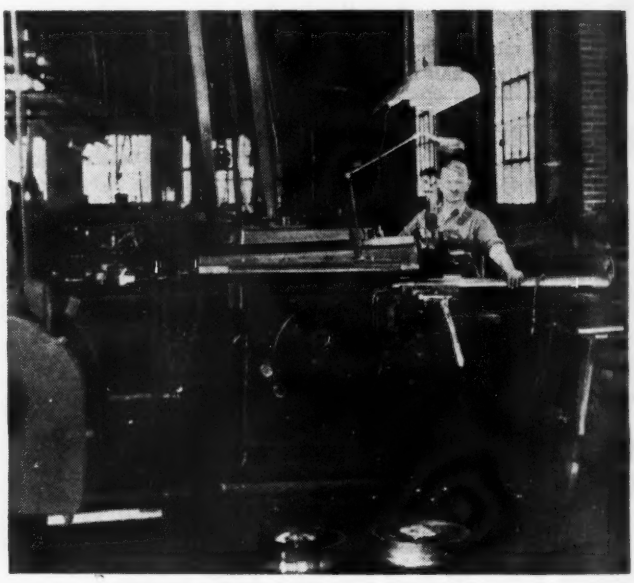


Bailing up the coal in a working place at Saxton.

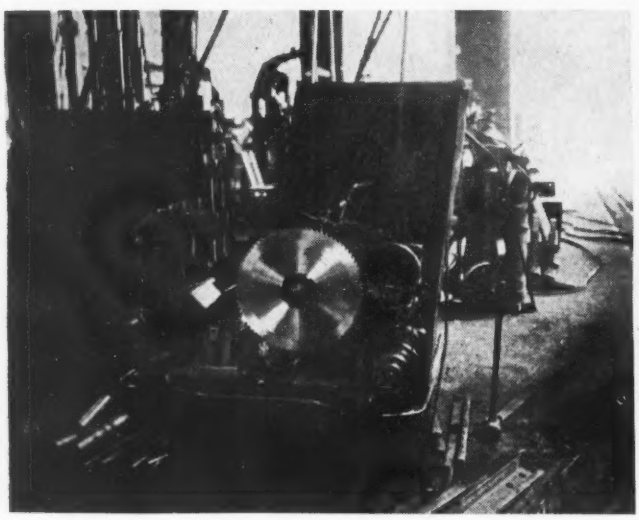
Track loader on the move in Saxton mine.



Gas-cutting stand in operation. Convenient receptacle on post provides connection for lamp or motor.



Cutting shaft keyway on a shaper. Fluorescent lamps above the operator indicate their brilliance.



Heavy cut-off saw for steel.

Truing a grinding wheel with a diamond.

Concrete tipple at man-and-material shaft, showing gob bin, brick hoist house and heating plant. The electric hoist motor is 200 hp. There is an auxiliary steam drive.

A well-designed storehouse—so much glass one can look right through it. Bosses' bath in nearest bay, garage in the south bay, receiving door in the center bay.

the working panels as the mine is developed. There is room for the disassembly of a cutting or loading machine. A few of the most frequently needed parts are carried for immediate use. Since all mine equipment is track-mounted, these "first-aid" stations provide prompt repairs for failures that are not too serious.

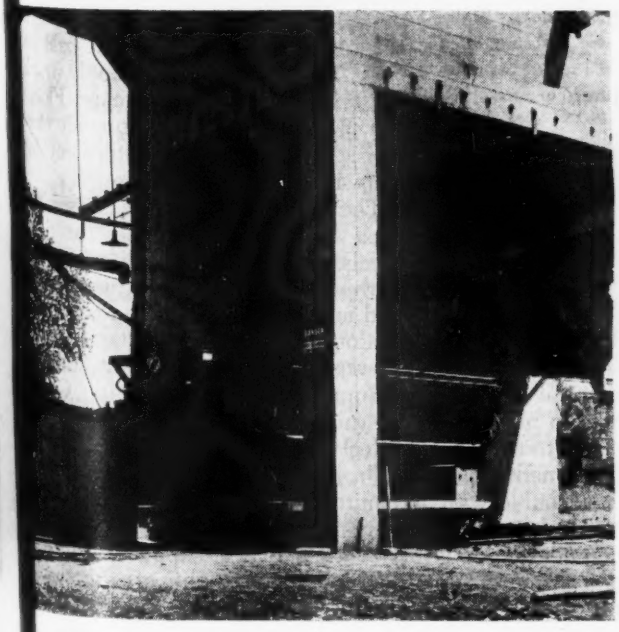
The repair shop at the man-and-material hoist has the facilities for doing a major overhaul job on any piece of mine equipment. It may receive direct from the mine an air compressor, a mine locomotive, a cutter bar or a loading head. There is a forge and the machine tools and appliances needed to clean, overhaul and reassemble any underground equipment. Mine-gage surface track reaches in and through the shop.

Renewal parts and supplies used in the repair shop come from the storeroom, just a few steps away, or from the upper shop. The latter items may have been reclaimed or manufactured new. This division of the maintenance work permits the segregation of men and facilities best suited to the two types of work. Essentially, one is a repair shop, the other a manufacturing plant.

The chief electrician has his office in the repair shop. He supervises electrical repairs and sees that underground electricians are supplied with material for new construction and day-to-day repairs. The armature winder is located in a separate room in this shop. Some heavy armature work is sent to commercial shops in Terre Haute.

The upper shop is to a large degree a manufacturing plant. It builds all new cars and repairs or rebuilds all old cars. It makes all frogs and switch points. It reconditions all machine parts that can be salvaged and manufactures many parts outright. The latter may be for either of two reasons: delay in factory shipment or lower cost when made at the mine. The shop is roomy and equipped with a variety of tools to work wood and steel.

The tools, with others on order, include a number not found in most mine repair shops. Among them are a milling machine, a heavy cut-off (circular) saw for steel and numerous grinding machines for keping tools in shape and for doing the refined machine work necessary for modern coal-



Supply yards. Note locomotive and mine cars on excellent ballasted track.

Electrically propelled gob lorry with trolley pole. This lorry was designed by the underground electrician and built in the mine shop. It has a conveyor bottom similar to a shuttle car to discharge the gob. The endgate unlatches when the conveyor starts. Various electrical parts are from used or discarded sources.

Table IV—Saxton Production Equipment

6 Jeffrey 29-LE cutting and shearing machines, 9-ft. cutter bars.
2 Goodman 324-AA cutting machines, 7½-ft. cutter bars.
9 Chicago Pneumatic 472-BR coal drills.
1 Goodman 260 loading machine.
8 Goodman 360 loading machines.

Table V—Saxton Haulage Equipment

1 Goodman main-line locomotive, 15 tons.
1 Jeffrey main-line locomotive, 15 tons.
1 General Electric main-line locomotive, 13 tons.
1 Jeffrey relay locomotive, 10 tons.
4 General Electric relay locomotives, 8 tons.
5 General Electric cable-reel locomotives, 6 tons.
8 General Electric cable-reel locomotives, 5 tons.
500 Wooden mine cars, 3 tons.
(All relay locomotives equipped with cable reels).

Table VI—Saxton Powerhouse Equipment

1 1,250-kva. Allis-Chalmers turbine.
2 375-kva. Allis-Chalmers generators driven by 23 x 30-in. 150-r.p.m. Erie City steam engines.
2 10- and 16 x 14 x 10-in. and 10- and 19 x 14 x 10-in. Ingersoll-Rand cross-compound water pumps.
1 Allis-Chalmers a.c. switchboard.
1 Boiler feed-water heater with duplicate cold-water pumps and duplicate boiler-feed pumps delivering hot water at 200-lb. pressure.

Table VII—Saxton Conversion Equipment

1 300-kw. General Electric motor-generator set.
2 200-kw. General Electric motor-generator sets.
1 300-kw. General Electric rotary converter.
1 300-kw. Allis-Chalmers rotary converter.

mining machinery. There also are the usual lathes, drill presses, shapers, and the forging, cutting and welding equipment that such shops must have for most efficient work.

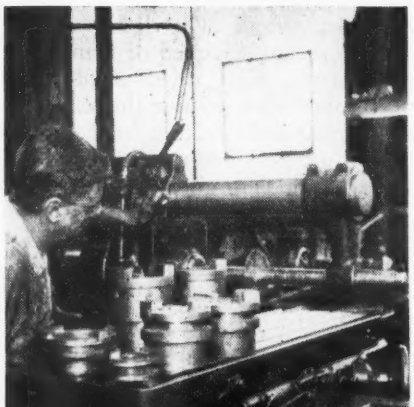
Now that "mikes" are common tools in mine shops, perhaps coal executives are persuaded that excellent workmanship necessarily must follow automatically. Saxton knows that may not be true, but the aim is to do as good work as was done at the factory —"better," says the foreman.

"Better" may mean a different material. To that end this shop began pioneering in "alloy steels" back in 1931. Very little 60,000-lb. carbon steel is used today. A large stock of alloy steels, with tensile strengths up to 125,000 lb., is available in its own stockroom. Markings, known to all workmen, enable them to identify each bar. When necessary to use a marked end, new symbols are stamped or painted on the left-over piece.

These high-tensile steels are machinable at a cost of double time or more. Extended wear and reduced breakage justify their use. Results outweigh the extra cost.

Alloy steels require suitable tools to work them. The Saxton shop uses Rex-AA, Rex-AAA and Carpenters' Star Zenith brands of self-hardening steels for lathe tools. "High-speed" twist drills, which cost twice that of low-carbon drills, are used when working alloy steels.

As one of the aids to better workmanship, Saxton recognizes the value of better shop lighting and is going to white fluorescent lamps. Units with two 40-watt tubes are suspended over the working position of each tool. Workmen and management are agreed that they aid vision and precision in machine work.



On the miller platen is a group of resurfaced clutch jaws for track cutters. Stainless steel is applied by arc welding as a "binder," followed by a facing of manganese. The jaws are finish ground to a rake of 7 deg.

These added suggestions from the shop foreman, out of his twenty odd years of experience at this mine, are an indication of the solution to the pressing problems of mechanical mining: "The aim of this shop is to make the work easier and to have the tools to do as good work as was originally built into the machine. The trouble with maintenance is not the work done in the shop but the poor understanding of mechanical matters by the supervisory force underground. All this shop work isn't worth 'too much' without trained supervisors down in the mine who have a mechanical bent. They must appreciate why certain things are done in certain ways."

Supplies for Efficiency

An important link in the maintenance set-up is the new storehouse. This fire-resistant building, which would normally be called fireproof, was built two years ago. Like the hoist house of the office group it is designed to serve certain other purposes.

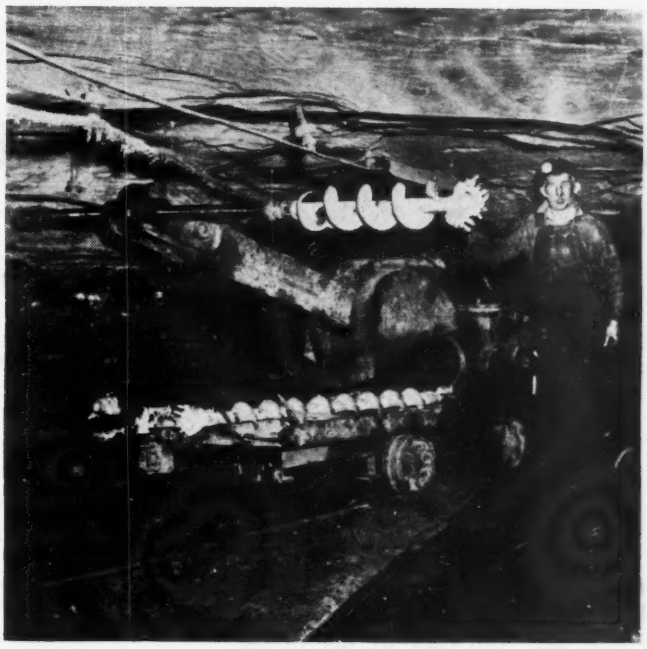
At the north end is a room set apart for the bosses' bath, bulletin board and toilet. Neat layout and good housekeeping characterizes these facilities. In a matching space in the south end of the building there are, back to back, a garage for the supply truck and a room for cement storage. Floors above these two sections provide storage space for easily handled or infrequently needed supplies.

The central floor space is used for steel supply cabinets and for floor storage of heavy parts. In one corner of this space is the office, with desks, card and catalog files and a combined lavatory and drinking fountain. Crane blower steam heaters supply warmth.

Supply records are kept on Globe-Wernicke perpetual inventory cards in a steel filing case. The stock clerk also is the purchasing agent for day-to-day requirements. This gives him complete control and up-to-the-minute knowledge of the supply situation.

The actual height of the supply building is sufficient for a two-story

Front view of Lee's road cleaner, showing drawbar for attaching to locomotive, the conveyor which carries the gob to the trailing car and Lee himself.



Self-propelling track-mounted 9-in. crossbar drill, made largely from near scrap—another product of Lee's brain. Hitch-drilling insures economy in permanent timbering.

structure. When needed, the central part, comprising more than half the floor space, can have a second floor installed, increasing the floor space about 60 percent.

The large window space provides unusually good lighting. The receiving door at the center and the garage door at the right move vertically and are hung on wire cables with balancing weights. Weights are suspended in discarded steel piping, protecting them from truck collision and workmen from injury.

The handling of mine-car loads of props, track materials, machines for the shop and machine parts for shipment to underground destinations is over a series of 42-in.-gage tracks to the material shaft. A 5-ton Plymouth gasoline locomotive, bought second-hand and overhauled in the mine shop, handles these shipments on the surface. The fact that all main-line haulage track is ballasted with gravel accounts for more than the usual traffic in construction materials at the Saxton operation.

Executive Personnel, Saxton Mine;

owned and operated by Walter Bledsoe & Co., with general offices in Terre Haute, Ind.

Walter A. Bledsoe, president.
W. S. Webster, executive vice president and general manager.
Birch Brooks, general superintendent.
H. C. Bean, assistant superintendent and mine manager.
Victor Vandevoir, electrical engineer.
Colvin Burk, mining engineer.
Thomas Durham, powerhouse and shop foreman.
Lee Martin, chief underground electrician.
Fred Hayes, assistant mine manager.
Howden Riggs, assistant mine manager.
Charles Andrews, night mine manager.
Joseph Auberry, chief clerk.
George Willoughby, storekeeper.
Jesse Ashburn, outside foreman.

Surface Arrangement

Saxton mine, developed primarily to serve a zinc smelter built on the property, has one group of buildings surrounding the hoisting shaft and another group around the man-and-material shaft. These shafts are 1,700 ft. apart.

The hoisting shaft has a compartment at one end for an escapeway, equipped with a steel stairway from bottom to top. This is a convenient aid when there is trouble with the guides or the skip.

Surrounding the hoisting shaft are the steel tipple, steel preparation plant, power plant, including water supply and treatment, the ventilating fan and upper machine shop. A part of the preparation plant is a large storage bin for hand-picked refuse used as a boiler fuel.

The buildings around the man-and-material shaft are the concrete tipple and the following brick buildings: mine office, hoist house, shop, washhouse and storehouse. A clean grass plot between the office and hoist house, together with several nice shade trees, result in a pleasing appearance.

Gob disposal makes use of the overturning cage to dump the refuse into a bin, from which it is drawn into a trolley lorry and hauled to the gob pile. That this refuse contains little coal is indicated by the small amount of fire and smoke. Since the coal is relatively clean in the vein and is all mined out between top and bottom, this would be expected.

CABLE CARE
Assures Service With Low Maintenance

Cable Service Depends Upon Surroundings, Service Factors and Treatment—Reliability Should Not Result in Abuse—What and What Not to Do Shown in Six Examples From Actual Experience

By FRED W. RICHART
Assistant Editor, Coal Age

ELECTRIC CABLES shoulder the load of the mine—usually without grumbling. But they are one of the links in the chain that must not fail if the coal is to be kept coming. Their record is so good that they enjoy full confidence of the management, as proved by the fact that duplicates seldom are installed and spares in the warehouse are infrequent.

Reliable as cables are, they do fail. Failure is seldom the fault of the cable. It may be due to some oversight in the installation, to neglect in operation or to overload. Or, it can be due to what Charles P. Steinmetz was wont to call "transient phenomena." Those two $10 words cover a lot of territory that is worth exploring, for the events they represent will recur year after year.

Perhaps the most disastrous of "transient phenomena" is lightning, either direct stroke or induced effect. The latter is the transformer effect on an electric circuit from a lightning discharge a mile or two away. Another is the surge set up in a circuit due to switching heavy currents; for example, opening of a circuit breaker, blowing of a fuse or a short. Still another is high voltage induced in long transmission lines on a windy day due to weather conditions. This manifests itself by intermittent discharges over the lightning arresters.

All these abnormal electrical events (currents or their undesirable effects) are "transient phenomena;" that is, fleeting incidents that quickly disappear. They frequently may be of such high potential as to puncture the insulation of cables and other electrical apparatus. Not a few cable failures are caused by breakdown of insulation from these unduly high voltages.

One phenomenon connected with long borehole cables that has not had the attention it deserves is the effect of heat from the current these cables carry. It is inevitable that heavy power loads cause cables to expand. Then they contract when the load goes off. This daily movement may be observed at the bottom of the borehole. It may amount to several inches of change in a 500-ft. length of cable.

Wire-armored d.c. cables, whether single-conductor or concentric two-conductor with copper wire armor serving as the return, are characterized by greater expansion in the positive conductor than in the armor. Such difference in expansion apparently has not proved to be harmful. However, the fear that it might lead to failure has caused the discontinuance of concentric cables by one large mining company.

Like people, cables behave according to their physical makeup, where they must work and how they are treated. The fact that cables have a good reputation is no reason to abuse them. Under war conditions there is more reason than ever to treat them with consideration. The following examples of how cables have acted, or "acted up," point the way to what to do or, sometimes even more important, what not to do.

1. A 1,500,000-cir.mil concentric 600-volt cable with the outer copper serving the double purpose of negative conductor and armor, and having an over-all serving of hemp, was vertically suspended in a borehole 320 ft. deep. The steel casing had an inside diameter of 4 in. The top end of the cable was grouted into the casing to carry the weight.

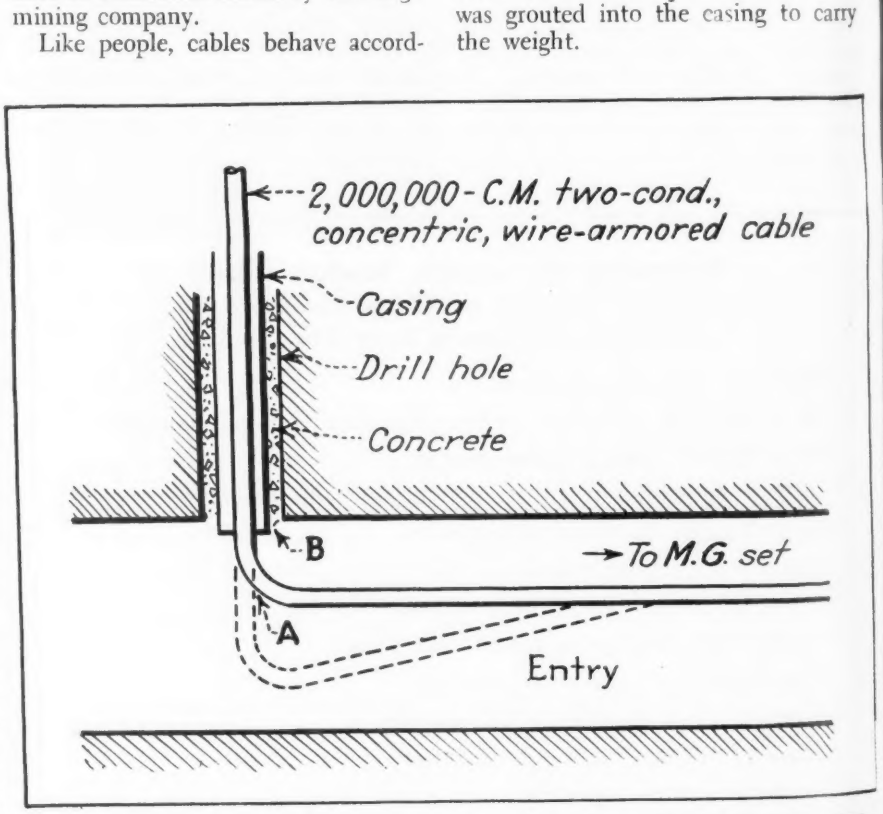


Fig. 1—Short curve at *A* pulled hemp serving against casing. Expansion and contraction chafed the hemp at *B* and ground current arced across, burning steel armor wires. Trouble cured permanently by grounding armor to casing at top and bottom of borehole and putting long curve in cable as shown by dotted lines.

Fig. 2—Two 2,000,000-cir.mil 600-volt insulated cables suspended by short pieces of wire rope clamped to bare cable. A half inch of friction tape on the steel car axles insulates the cables.

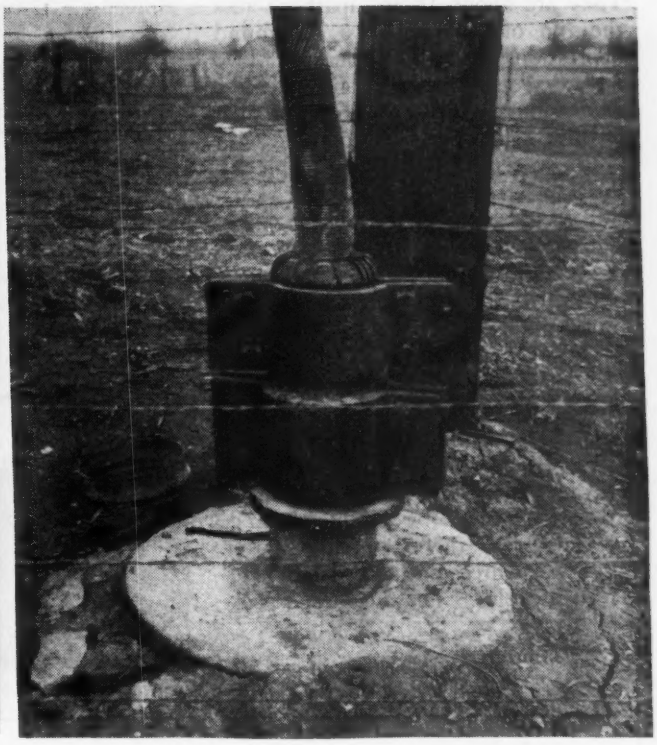


Fig. 3—One method of supporting 3,000-volt wire-armored three-conductor power cable in a borehole. The cable is connected to the pole line without potheads as shown in Fig. 4.

After years of service carrying the d.c. load from a 500-kw. 275-volt generator, that section of the mine was worked out and the substation moved. An effort was made to salvage the cable. It could be moved up and down a few feet but always lodged and could not be moved farther with the means at hand.

A well driller was employed to try to pull it with his cable jack. The steel-drill cable was clamped to the outer conductor of the electric cable and the power applied. The rig was strong enough to pull the copper wires in two down in the casing but did not budge the cable, so recovery had to be abandoned.

2. To save on installation costs at another mine, changing from an 8-in. casing and two single-conductor cables to a 4-in. casing and a two-conductor concentric armored cable, similar to that previously discussed, resulted in a similar difficulty. In this instance the cable size was 2,000,000 cir.mil, with the inner conductor lead covered and the outer conductor also serving as the armor. This cable carried 275-volt d.c. power from two 300-kw. motor-generator sets located on the surface.

A fire occurred in the substation. Along with other damage the cable was burned, so there was no good insulation above the casing to reconnect to. It had to be pulled up enough to make a new connection. Two 10-ton jacks were used to make the pull. Stress was applied until good judgment indicated a safe limit had been reached. The cables had moved 5 or 6 in. The jacks were allowed to stand overnight under this stress. The next day the cables were pulled another 5 or 6 in. This procedure was repeated for a week. By that time enough cable was out of the casing to make a satisfactory connection.

3. An interesting experience with a steel-wire-armored cable carrying 275-volt d.c. power down a borehole had its roots in daily expansion and contraction under alternating conditions of heavy and practically no load. When load is applied in the morning, the cable gradually stretches. During the day it may shift somewhat with load changes. With little or no load at night it contracts to its normal length.

Bend Results in Chafing

This cable was installed with a very short bend at the bottom of the borehole which brought the hemp serving against the lower end of the casing. The daily movement of the cable finally chafed through the serving so that metallic contact was made between casing and the wire armor. Returning ground currents caused arcing which burned some of the armor wires in two.

Two things were done to cure this trouble (Fig. 1). The wire armor was grounded to the casing at both bottom and top. This stopped arcing. The cable was given a long sweeping bend where it emerged from the casing. This stopped chafing of the serving and ended accidental contact.

As a result of the last two experiences a new borehole set-up has been designed. No trouble has developed between conductors in concentric borehole cables, yet they are ruled out for fear unequal expansion between inner and outer conductors may cause such trouble.

The new arrangement uses a 5-in.-inside-diameter casing anchored in place with cement grout pumped in under high pressure. This makes an absolutely waterproof job that will serve as a conduit even if the casing rusts out. Two 600-volt 2,000,000-cir.mil single-conductor rubber-insulated cables are suspended in this casing, each from its own support. These two cables supply power from 600 kw. of conversion equipment to underground workings at 275 volts. The cables are both insulated so that if one breaks down, polarity can be changed in minutes.

The cable support is unusual. Two elongated concrete pillars, 3 ft. high and 10 in. thick, are positioned with

one on each side of the borehole. They are about 18 in. apart. Across the top of each are two half-round depressions, each 3 in. across. Two discarded car axles are laid in these depressions. The center 6 in. of each of these axles (Fig. 2) is covered with a ½-in. layer of tape. The cable insulation is stripped for about 1 ft. and a wire loop resting on the taped section is clamped to it with wire-rope clips. The free end of each cable is connected to the panel buses just above.

These boreholes are about 500 ft. deep. The weight of the cable is carried by the copper conductor itself.

4. Here is an interesting record of results where the standard power arrangement is motor generators underground, supplied by 2,300-volt. a.c. power carried down boreholes over 3,000-volt three-conductor steel-wire-armored cables. These cables are suspended by the wire armor as shown in Fig. 3.

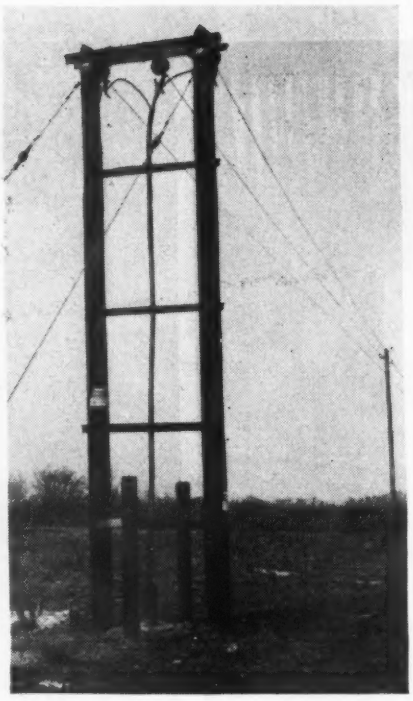


Fig. 4—Connecting cable to pole line without potheads. Conductors are waterproofed with tape and lacquer.

The method of connecting to the pole line without the use of a pothead is rather unusual (Fig. 4). These connections are taped and painted with Glyptol lacquer. A part of the maintenance program is to repaint these joints annually.

The only case of trouble in more than 20 years occurred inside the mine and was not the fault of the cable. Fig. 5 is a diagram of the connections. The accident was due to a new operator opening a 2,300-volt disconnect with the set still running. This started a short that apparently traveled over the steel armor to the top of the drillhole to reach ground. The armor became quite hot but the rubber insulation was still good. For

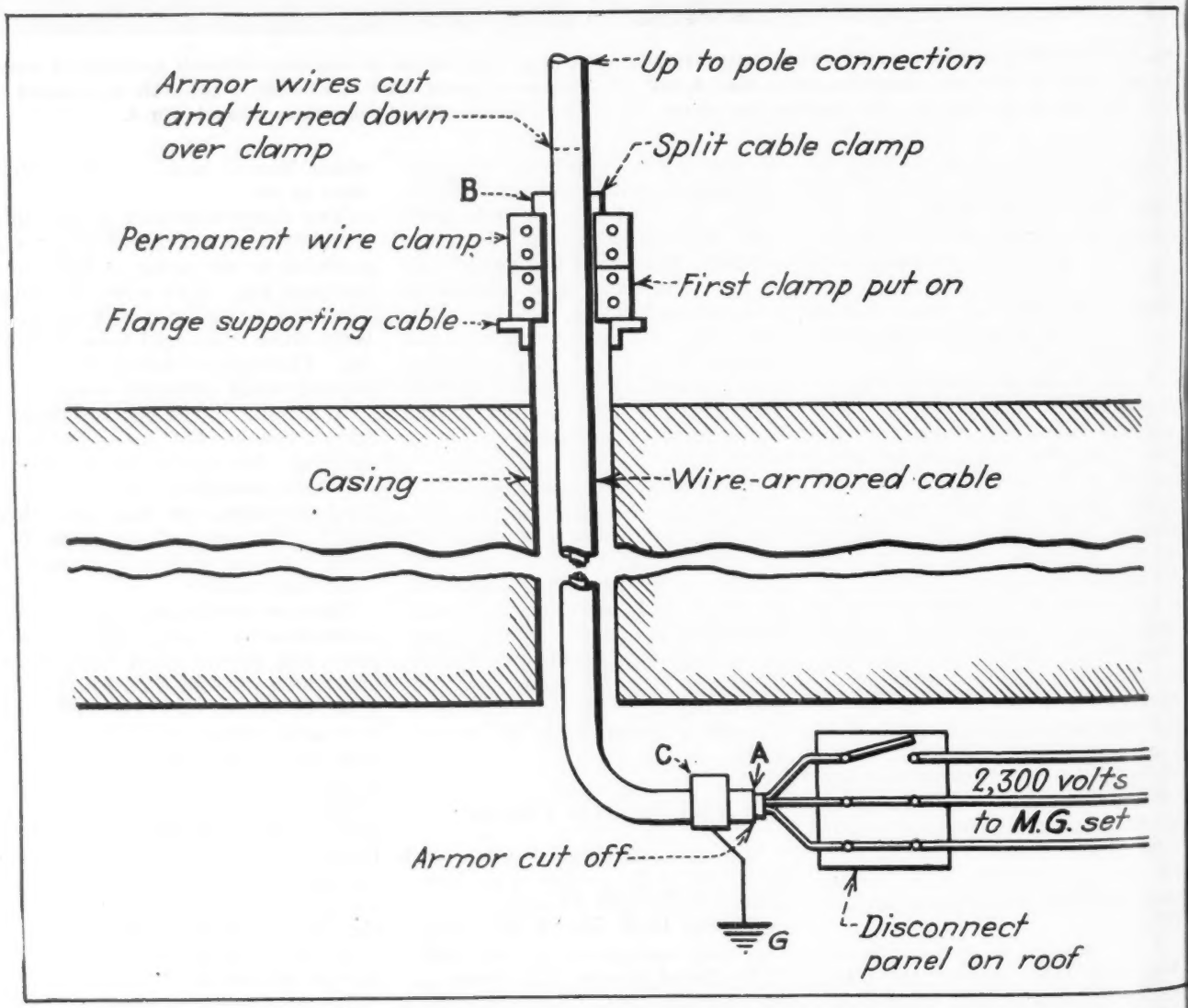


Fig. 5—Operator opened 2,300-volt disconnect with set running. Current flashed to armor at *A*, then to ground at *B*, heating the armor but doing the insulation no material damage. The armor was permanently grounded at *C* for future protection.

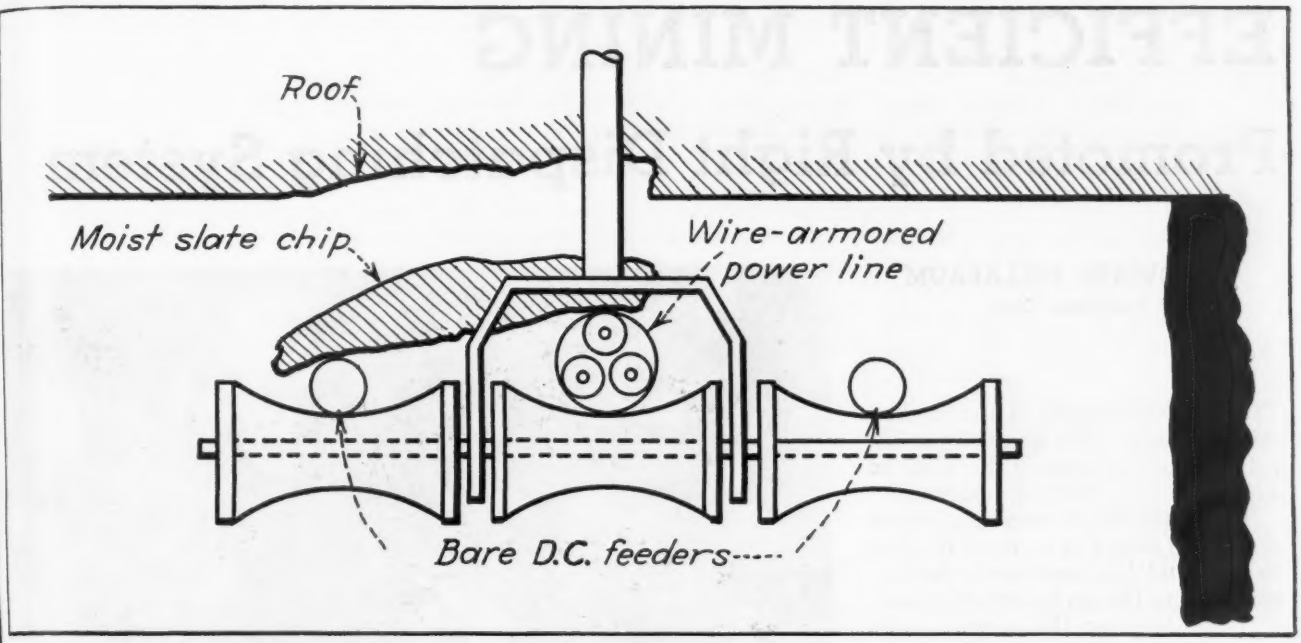


Fig. 6—Moist slate lodging across bare d.c. feeder and grounded steel armor of a.c. power line caused burning of armor. Cured by installing a.c. cable on one side and d.c. feeders on other side of entry.

future protection of the insulation the armor was grounded as shown.

5. The installation of a 2,300-volt three-conductor three-phase steel-wire-armored cable on the same hanger with a bare d.c. feeder leads to serious trouble. In this case the wire armor was frequently grounded and was separated from the feeder by only a few inches. The roof is slate that scales off in thin slivers and, like all slates, is porous enough to hold considerable moisture.

Bits of this slate would lodge on the two cables and carry current from the d.c. feeder to the wire armor of the a.c. cable. This burned the steel wires in two, as indicated in Fig. 6.

The remedy was separating the a.c. and d.c. cables by installing them on separate hangers, one on each side of the entry.

6. An unusual cable antic grew out of the war materials situation. It appears that the customary type of 3-conductor cable for a 2,300-volt reversing hoist motor was not available, so the manufacturer offered some single-conductor cable as a substitute. This was purchased and installed without any particular thought being given to the spirally wound copper strip under the outer weave.

The entire installation consisted of three leads from the pole into the building, about 25 ft., and three leads from the reversing switch to the motor, about 50 ft.

When power was switched on, the terminals of the incoming line attached to the oil-circuit breaker (about 4 in. apart) arced over. The power was switched off and the equipment let stand until the next day. Then the power was applied again, with renewed arcing. The motor was not operating when these flashovers occurred. The entering line merely had potential on it.

Fig. 7—Well-installed borehole cable—no chance of movement chafing outer braid.

The voltage apparently was in excess of 300,000 to flash across 4 in., checking fairly well with the gradient of about 1,000,000 volts per foot for lightning and the approximate gap of $\frac{3}{8}$ in. that 33,000 volts will jump.

Attention was called to the protective spiral-steel wrapping that frequently is used over a 3-conductor leaded cable to protect the lead from injury. In this case the transformer action is nullified because of the three conductors being inclosed in one sheath.

These and kindred experiences indicate the need for observing the following precautions when installing power cables in boreholes:

1. Drillholes large enough to grout the casing in place so entrance into the workings will be dry. Pressure grouting is preferable.

2. Casings large enough so that the cable may be recovered readily.

3. Suspension of the cable by a strong, reliable device.

a. In the case of armored cables, by a clamp designed to take the weight of the cable on the armor.

b. Ground armor to the casing top and bottom.

c. Install unarmored cables of such length that the conductor will not cut the insulation and ground.

4. Extension of the cable a foot or more below the bottom of the casing, with a long bend to the connections, as in Fig. 7.

5. Protection of well-taped joints with a proved weather-resistant lacquer in case the customary pothead is omitted for economy or is not available.

EFFICIENT MINING

Promoted by Right Dispatching System

By EDWARD FELLABAUM
Powhatan, Ohio

While haulage is a primary task of the dispatcher, he can, if qualified and given the opportunity, help out in many other ways in coal mines.

THE NERVE center of the modern mine certainly is the so-called car dispatcher. Just as certainly the sheet he keeps is a true chart of operation.

The dispatcher in most coal mines is regarded simply as someone to route the trips and distribute cars to the various sections. He can be infinitely more than this, however. His services can be invaluable in many ways—all directly connected with the intelligent distribution and routing of trips.

Most coal-mine dispatchers are chosen for the job because they were good motormen and were handy and "willin'" when a dispatcher was needed. The eventual cost to the industry of such offhand decisions can be approximated only by one who is fully conscious of the potentialities.

Many mine managers believe that they have so formulated the policies governing their dispatchers that the manner of executing these policies is unimportant. The truth is that haulage systems are often "gummed" by these very policies, which may be ill-conceived and inflexible for lack of a keen conception and appreciation of the potential advantages of a good dispatching system.

Synchronization Essential

Synchronization of every operation incidental to mining coal and hauling it to the surface is essential to safe, smooth and economical performance in any mine. The dispatcher is the one medium that the management can use most conveniently to achieve this objective. He is advantageously situated to keep tab on everything being done throughout the entire operation and should be trained to detect, diagnose, remedy or otherwise deal with any irregularities that may occur at any place in the mine.

The dispatcher must of necessity have the power to direct the haulage crews, distribute the cars, control the speed at which trips are moved, determine how, where and when trips may be operated and how they may be routed between dumping and loading points. This in turn determines the number of haulage employees, the number of haulage units, the mine cars that may be required and the magnitude of power peaks and the quantity of energy consumed. He certainly controls and directs the entire operation in so far as these many details are concerned. Coming within his sphere of activity is virtually every phase of coal-mine operation.

The dispatcher is so situated that he may exert either a benevolent or malign influence upon practically every person working in the mine. With the proper knowledge in his possession he may become a mighty influence in the safe, smooth and economical operation of any coal mine.

The intelligent dispatcher can eliminate delays, prevent breakdowns, increase production, reduce power costs, eliminate expensive haulage units and personnel, haul more coal with fewer mine cars and make himself so valuable and indispensable that mine management can no longer afford to operate without him.

Many operations do get along without a dispatcher for the simple reason that they have a very inferior substitute and don't know the difference. Feeling secure in the belief that they have the best in the person of the good motorman, the one who was handy and "willin'" when a dispatcher was needed, they are failing to get the maximum advantage from a job done the right way.

The world for ages has laughed at the man who locked the stable after the horse was stolen. The intelligent dispatcher will anticipate and provide for all conceivable eventualities. He will formulate and insist upon the adoption of preventive measures designed to forestall costly power interruptions, mechanical failures, etc. For preventive measures of this kind are just as necessary as accident prevention and preventive maintenance.

The dispatcher is the one man in the mine organization who can and should tabulate these interruptions and breakdowns, diagnose them and see that measures are taken to prevent their recurrence.

He will see that an intelligent system of checking, inspection, oiling and repairing of all equipment, machinery, tracks, etc., is adopted and religiously followed, for he knows that unless this is done the coal will not continue to flow without interruption.

He will insist upon an intelligent

cycle of cutting, drilling, shooting and loading at the working faces, for he knows that this is vitally important to steady, smooth, economical production.

He will emphatically insist upon adequate and convenient permanent and semi-permanent trackage and sidetracks in close proximity to the working faces, for he well knows that production of loading units may go off 50 percent or more due to these causes. The location and capacities of these sidetracks is of primary importance, for this is a major factor governing the potential and actual production of loading sections.

Every loading section should be assigned a standard production quota. A section producing 70 cars in a 7-hour shift should produce 10 cars per hour. There are exceptions, of course, but ignoring this fundamental truth probably is the cause of more chaos and confusion than any other one thing contributing to irritable, spasmodic and inefficient mine haulage.

Good Sheet Helps

A properly prepared and executed dispatching sheet can be of inestimable value to the operation of any mine. It should be arranged so that all information and data "fit"; otherwise, it will be a burden and source of annoyance to the dispatcher, confusing to others and practically worthless.

The sheet should show at a glance everything pertinent to haulage. It should show the number of cars hauled by each crew, the origin and destination of each trip, time of departure and arrival at each terminal, cumulative total of empties and loads. Where trips are made up from various sections the loads from each section should be assigned a code or symbol and the sub totals should be carried in brackets. This gives a permanent record and shows the origin of each trip hauled to the dumping point.

The sheet should have a separate block for each crew, with six vertical columns for empties and seven columns for loads. Paralleling the actual performance should be the assigned schedule and standards. This shows, instantly, whether performance is standard, above or below. The sheet should provide for recapitulation of haulage performance, although if properly kept this is done automatically by means of the cumulative totals. There should be suitable space to show delays, remarks, etc. An extra wide margin should be provided for notes.

Close and intelligent cooperation between the dispatcher and all working sections is necessary. The benefits from this are substantial, immediate, obvious and reciprocal.

The foreman, face boss or supervisor of each loading section should check with the dispatcher at the beginning and end of each shift as to the number of loads and empty cars standing. At the start of each shift he should report to the dispatcher the following:

Estimated number of cars required for the shift.

Condition of section, machinery and equipment.

Coal prepared for loading.

Number of places cleaned up.

Number of men working.

Any other pertinent facts.

At the end of each shift the supervisor should report the following information to the dispatcher:

Condition of section, machinery and equipment.

Delays and their nature.

Coal prepared for following shift.

Performance (production) for the shift.

Any facts helpful to the oncoming shift.

The intelligent dispatcher will have on his desk at all times—and changed and amended as often as necessary—charts showing the following:

Location and capacities of all passways and sidetracks.

Location of all doors and regulators pertaining to ventilation.

Kind, type, serial number, horsepower and all other pertinent facts relative to all machinery and equipment.

All pertinent information relative to the fan (or fans) and ventilation, horsepower of motor, number of splits, water gage, etc.

Distances between various points and terminals.

Hauling capacities of various locomotives.

He should be familiar with the primary sources of power, the capacities and locations of all substations, circuit breakers and wiring circuits inside or outside the mine that are pertinent to its operation. He should, if possible, have a schedule showing at what times the various machinery or equipment units are operated. Where water is pumped he should have all data relating thereto with a schedule showing at what hours the various pumps operate.

A smart dispatcher may prevail upon the mine management to enforce a pumping schedule that will make available quantities of power (otherwise used for pumping) at certain hours when it is most useful to the mine operation, and cause the water to be pumped at those hours when the power is least needed or when it will contribute least to peaks or overloads. This may be done by changing pumping hours, changing pipelines, creating more storage or other means.

The dispatcher can save power by understanding certain fundamental laws and applying them to movement of trips. He knows that size of trips has relatively less to do with peak loads; that these are governed by the number of cars moved simultaneously; and that conflicting delays vary directly as the number of units using the same track.

The intelligent dispatcher (via the haulage personnel) can keep thoroughly informed and familiar with the condition of tracks, wiring and roof throughout the entire mine. This information should be noted on the dispatching sheet daily for the benefit of the mine management.

Should a fall occur at a certain place or a door be broken down he knows what to do. He may even tactfully suggest to the "practical" mine foreman some means whereby it will be unnecessary to rebuild the door and at the same time remove several others. He knows that the largest single item of power cost probably is ventilation and he may have a few suggestions as to how this may be reduced.

He knows that when starting a heavy trip the brake should be released and the motors put in parallel. He knows many things that are valuable and that contribute to the general safety and economy of the operation, and he finds ways and means to impart this knowledge to others for the benefit of everyone concerned.

Training Pays Off

It is obvious that dispatchers with the knowledge and training necessary to perform the duties suggested here do not grow on trees; nor do we find them ready fitted for the job. Surely the education and training for such important work is well worth while, and the benefits to be derived many times outweigh the cost. A very small part of the daily outlay for operating without an efficient dispatching system would pay the cost of educating and training efficient dispatchers for practically every mine in the country.

The possibilities for improvement are almost limitless and it is a safe bet that there is not a mine in the country that would not benefit greatly by installing a dispatching system or improving the one in operation. It is past the time when mine management should remove dispatching from "a materials handling job" and appreciate the really important place it deserves.

THE FOREMEN'S FORUM

Extinctive Gases to Subdue Mine Fires

More Gas Is Needed Than Increase in Extinctive Gas Would Indicate—However, Methane and Gases From Fire Reduce the Requirement a Little

EXTINCTIVE GASES are being used in mine fires to raise the percentage of such gases as are already present up to a degree that will prevent an explosion or at least so enfeeble it that it will not destroy the stoppings. In every instance, a percentage of extinctive gas will be present at the moment when the stoppings are closed and more will accumulate later, and perhaps, still more importantly, some of the oxygen will be adsorbed—that is, piled up on the surface of the coal and in its crevices—and some will combine with the solvent matters in the coal and so will be absorbed, sometimes actually combining therewith.

Size Regulates Share

This adsorption and absorption count most because they cut down the quantity of oxygen directly and do not decrease the percentage merely by the addition of more gas. The former sorptive methods, adsorption and absorption, usually are quite active, fortunately; in fact the fire has activated the coal and made it adsorbent.

The other method, the addition of inert gases, the only one the fire fighter can undertake, has the drawback that not only do you have to decrease the percentage of oxygen but to reduce also the percentages of all the original constituent gases—nitrogen, oxygen, methane, carbon monoxide and dioxide, argon and whatever other gases are present. They all demand some of the added gas in proportion to their original percentages. The original nitrogen, the largest constituent of the air, calls for the major part of it.

When dilution occurs, either with air, other nitrogen or carbon dioxide, it is the nitrogen that receives most of the dilution and not the oxygen, argon or other minority member of the analysis. You can't feed one without feeding all the rest of the family. Of course, the addition of extinctive gases increases the volumes of those gases, but really what is wanted is a decrease of the oxygen, methane and carbon monoxide.

The analysis of an atmosphere in which flame will be extinguished by its own burning shows 15.60 percent of oxygen and 84.40 percent of extinctive gas. Such a percentage certainly will not produce an explosion but only a mild ignition, and no percentage near it will produce any more than one of minimum violence. Now let us figure the quantity of nitrogen that will have to be added to cut down the percentage of oxygen to 15.60. It will be shown later that to reduce the oxygen 5.33 percent, from 20.93 to 15.60, it will be necessary to add 34.17 percent of extinctive gas.

To make matters simpler, let the atmosphere after the addition of extinctive gases be assumed as consisting of 15.60 cu.ft. of oxygen and 84.40 cu.ft. of diluting gas per 100 cu.ft. of atmosphere. To obtain this percentage by adding an extinctive gas to ordinary air, let us say x cu.ft. of such gas must be added, making $100 + x$ cu.ft. of atmosphere. The quantity of extinctive gas now will be $79.07 + x$ cu.ft., as the air already has 79.07 cu.ft. of extinctive gas (nitrogen plus argon plus other extinctive gases). As already said, you can't add merely $84.40 - 79.07 = 5.33$ cu.ft. and say that this will be all the extinctive gas needed. The total quantity is now 100 cu.ft. + x cu.ft. or $100 + x$. Obviously, as the total volume is $100 + x$ cu.ft., the relation between the new quantity and the old is $\frac{100+x}{100}$, so we shall divide the quantity of extinctive gas by that figure $= \frac{79.07 + x}{\frac{100+x}{100}}$. Multiplying the numerator and denominator by 100 we have $\frac{(79.07 + x)\ 100}{100 + x}$. But we have seen that the value for this quantity we are trying to get is 84.40. That is, when we finish, the quantity of inert gas should be 84.40 cu.ft. in every 100 cu.ft.

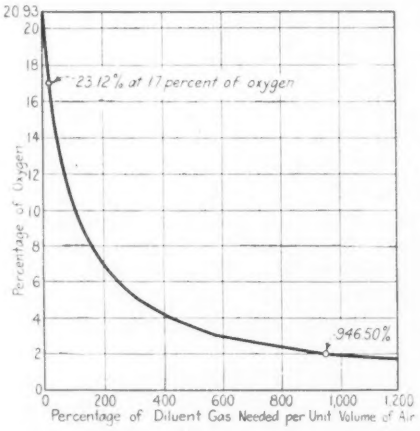


Fig. 1—Shows how quantity of diluent gas needed to reduce oxygen percentage increases as quantity of oxygen decreases because diluent gas as added augments mostly the large quantity of diluent gas already present.

$$\text{so } \frac{(79.07 + x)\ 100}{100 + x} = 84.40.$$

Multiplying both sides by $100 + x$

$(79.07 + x)\ 100 = 84.40\ (100 + x)$.

Simplifying both sides,

$7907 + 100\ x = 8440 + 84.40\ x$

Subtracting 7907 from both sides

$100\ x = 8440 - 7907 + 84.40\ x$

$100\ x = 533 + 84.40\ x$.

Subtracting $84.40\ x$ from both sides

$100\ x - 84.40\ x = 533$

$15.60\ x = 533$

$$x = \frac{533}{15.60} = 34.17 \text{ cu.ft.} = 34.17 \text{ percent.}$$

Checking this:

$$\frac{\text{Old plus new inert gas percentage}}{\text{Old volume plus added volume}} = \frac{79.07 + 34.17}{100 + 34.17} = 84.40$$

$$\frac{\text{Old oxygen percentage}}{134.17} = \frac{20.93}{134.17} = 15.60$$

This 34.17 is a large percentage of gas, but the conditions are not so strongly against extinctive gas as this might make it appear, because there is no need to raise the percentage of extinctive gas to 84.40 or to lower the percentage of oxygen to 15.60, for reasons already explained. Unfortunately, we do not know just what percentage will serve us or what percentage of methane and carbon dioxide will be added by the fire and the coal seam nor how much oxygen will be taken up by the coal or the fire nor how perfect the mixing will be, but certainly 34.17 percent of diluting gases would be excessive.

The table shows the oxygen percentage after the diluting gas is added and the

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quantity of the diluent for all percentages down to 14 percent, which is the percentage when the oxygen is in such small quantity that it can scarcely continue to combine with methane. It must be remembered that methane also is a diluent gas, and there must be 5 percent present before there will be an explosion. This quantity, 5 percent, is almost unchanged even when the percentage of oxygen varies from 15 to 20.93 percent. So 5 percent can be assumed as being present or the explosion would not occur. But if there is 5 percent of methane present, and 2 percent of carbon dioxide, there will be 93 percent of other gases, so that quantity of methane and carbon dioxide added to get 7 percent would be $\frac{7}{0.93} = 7.52$ percent. This will be deducted in each case from the quantity of extinctive gas to be added.

EXTINCTIVE GAS NEEDED TO OBTAIN GIVEN OXYGEN CONTENT

Oxygen Content Percent (1)	Diluent Gas Needed (2)	Extinctive Gas (2) – 7.52 (3)
19	10.06	2.54
18	16.27	8.75
17	23.12	15.60
16	30.81	23.29
15.60	34.17	26.65
15	39.53	32.01
14	49.50	41.98

Perhaps 17 percent is a sufficiently safe percentage to assume for oxygen. In that case, 15.60 percent of extinctive gas would be needed. An entry 300 ft. long would have with return and crosscuts perhaps 700 ft. of length. If the heading width is 8 ft. and the height 6 ft. the volume would be $8 \times 6 \times 700 = 33{,}600$ cu.ft. The extinctive gas needed would be $15.60 \times 33{,}600 \div 100 = 5.242$ cu.ft. or say 22 cylinders, each of 237 cu.ft. capacity. Quite a large quantity! But every little addition of extinctive gas helps, and today the work often is done with none whatever, but at how great a risk?

When priorities do not intervene, nitrogen can be obtained 99.7 percent pure. Among the impurities probably are neon and helium, both of them extinctive gases and therefore unobjectionable. The gas is made as a byproduct in the compression and cooling of air for the liquefaction of oxygen, but the costs of compression of the nitrogen, of the tanks in which it is contained, its transportation and limited use make it not inexpensive.

Nitrogen has the advantage that, when it expands, it does not freeze and choke the manifold. Its expansion incidentally will result in considerable cooling.

Dioxide Cools Coal

Carbon dioxide not only acts as an extinctive gas but also cools the air, thus making room for itself behind the seals, and so tends to prevent air outleakage with its losses of expensixe gas. However, perhaps nitrogen by checking the fire and by cooling the area in a minor degree will make enough room for itself. Unfortunately, carbon dioxide will freeze in the manifold unless that pipe is heated and, if the gases are heated, the cooling characteristics are lost. Either nitrogen or carbon dioxide tanks can be left to do their work without supervision, but the latter will need artificial heat or they will clog.

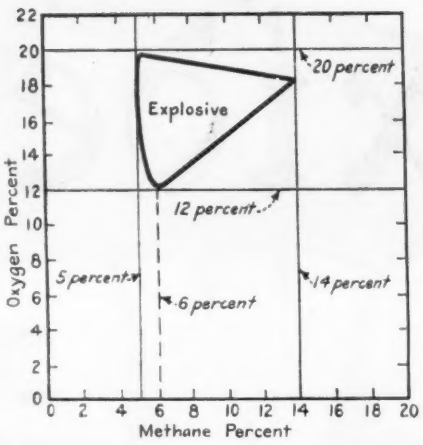

Fig. 2—Flame will spread upward with 5 percent of methane present almost regardless of the quantity of oxygen available, though by the time 12 percent oxygen is reached, the percentage has more rapidly increased and is about 6.

Dry ice, unless put in before the seals are closed, will need an air lock and men in oxygen breathing apparatus to put it in the sealed area. If the fire is in the low part of the inclosure, the coolness and heaviness of the evaporated carbon dioxide will be likely to keep the gas in and around the fire if, as dry ice, it is there deposited. It therefore will cool down the fire considerably. This quality causes favor to be shown dry ice for completing the job when the fire apparently is out but may revive unless it loses the few degrees of temperature necessary to carry it below the critical point. Carbon dioxide is less likely to pass through crevices to the outcrop than nitrogen because of its higher specific gravity.

When the immediate danger of checking a fire is passed, care should be taken to see there is no unbalanced outby or inby pressure on the seals, so that on the one hand no extinctive gases will escape and on the other hand no air will enter. By the addition of such gas when needed an approximate balance between internal and external pressures can be assured.

Path Across Lots

Travel of gas out of the inclosure at one stopping and in at another will suggest that there is a difference in pressure between the sides of an inclosure and that the air is trampling a path across lots. With gases in cylinders, the opening or closing of a valve or valves will regulate quantity. With dry ice, such regulation is not readily possible.

The curve in the first illustration shows clearly how the reduction of a minor constituent by dilution is difficult. To reduce the content of oxygen in the air down to 1 percent would require 19.93 volumes of diluent gas for every volume of air. Dilution is not the way in which the percentage of oxygen is reduced at mine fires to zero or near zero. That is largely done by sorption of oxygen, though the addition of emitted gases, such as methane and carbon dioxide, does its part. But this sorption of oxygen is slow; we cannot wait for it; if we do, an explosion is possible.

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Less Faith in Seals, More in Wet Weather

A sealed mine fire is difficult to control when the barometer rises, because the stoppings are then almost sure to leak, and if a fire under these circumstances revives it is not a matter for great despondency. A time is sure to come when the barometer will fall or be reasonably constant and then the leakage will stop and the fire will go out for lack of oxygen. Depend not so much on the stoppings as on (1) wet or, better, muggy, weather with its low barometer; (2) on the oxygen-free gases, like methane, evolved by the coal, and also (3) on equalities of air pressure on all sides of the fire. Bright, high-barometer days aid in reviving mine fires; glum, low-barometer days don't suppress the fire, but they give it time to suppress itself or to let the gas from the coal perform that office.

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Electric Safety Need of Coal Mines

By RICHARD MAIZE
Secretary of Mines
Harrisburg, Pa.

A great change is taking place in the coal mines of the nation. More and more is electricity finding a place in the mechanization of both anthracite and bituminous mines. While the need for it is obvious if the coal industry is to live and prosper, care should be exercised so that the added fire hazards and new sources of gas ignition be safeguarded in all presently installed or proposed electrical installations in coal mines.

A condition never before recorded in the history of mining now exists in West Virginia, Pennsylvania and Ohio. In West Virginia the bodies of 16 men are sealed in a mine; in Pennsylvania there are 6 and in Ohio, 64. All are the result of mine fires caused by electricity.

I respectfully urge every mine operator, mine superintendent, safety engineer and mine inspector to carefully check the electrical equipment in the mines under his jurisdiction and direct that such equipment be installed in a manner that will tend to reduce to a minimum the possibility of mine fires.

So that you might not defeat your purpose when installing electricity in your mine, always remember that when an electrical installation does what it is supposed to do and accomplishes its end it is efficient. Speed and production may be desirable, but they are only the frills of an efficiently installed equipment and will come as a natural result of proper installation. Installation is the first and most essential step.

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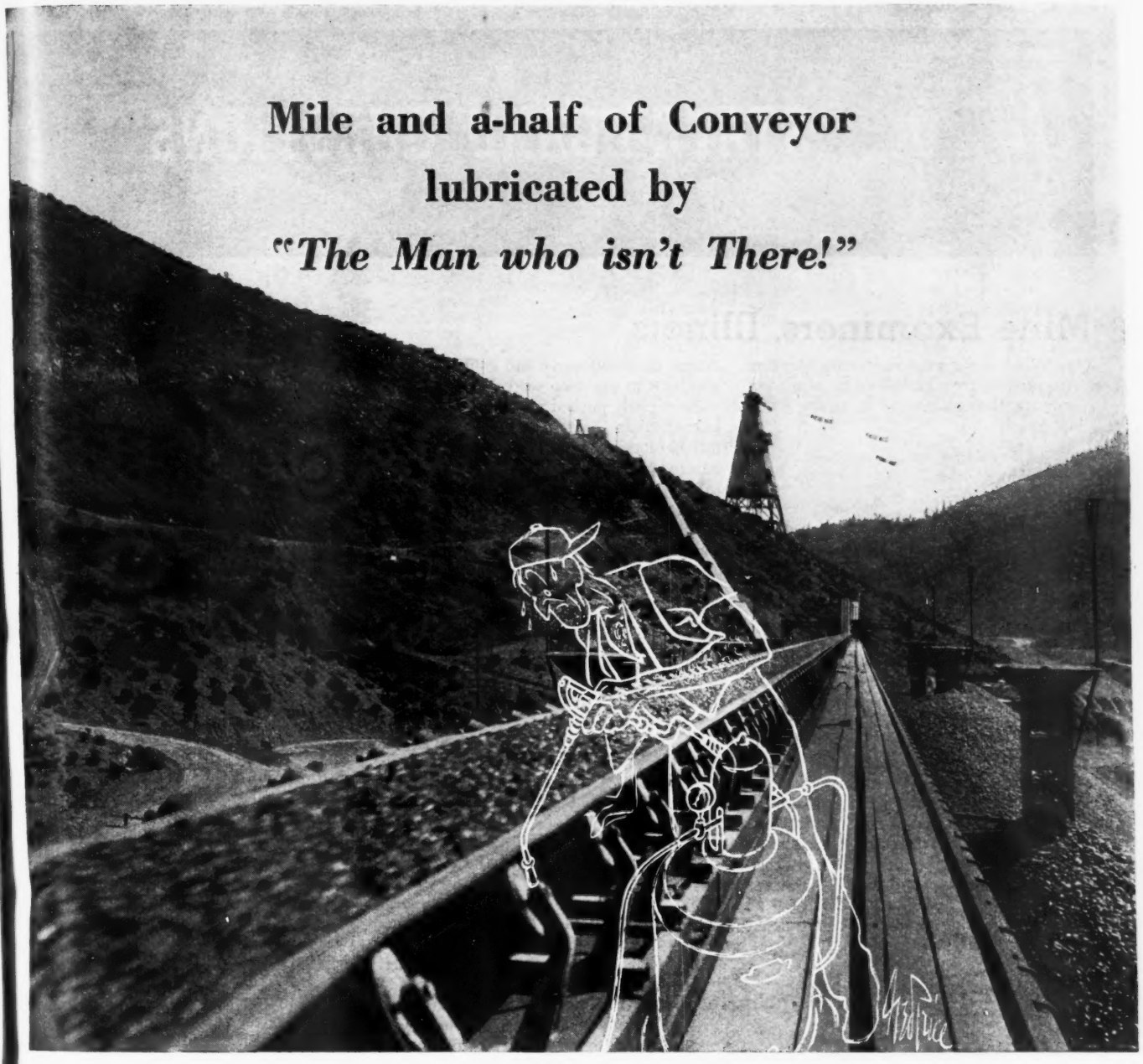

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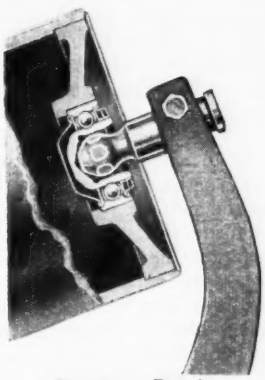

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STATE-BOARD QUESTIONS

Mine Examiners, Illinois*

Q.—What is the total ventilating pressure required to pass 22,400 cu.ft. of air per minute, through an 8x8 ft. airway 5,000 ft. long?

A.—Air volume = cross-section × velocity = av.

$22{,}400 = 8 \times 8 \times v$

So, velocity = $\frac{22{,}400}{8 \times 8} = 350$ ft. per minute.

The equation for ventilation is $p = \frac{ksv^2}{a}$ where p = pressure in pounds per square ft.; k = a multiplier, or "coefficient" which represents the resistance that would be experienced by air in traveling over one square foot of surface at a speed of one foot per minute, s = the area of the cross-section of the airway, k = 0.00000002 will serve for this question. The value varies with different conditions. s = the "girth" measurement of the heading, otherwise known as the "perimeter" multiplied by the length of heading = the length of the two sides (8 + 8 or 16 ft.) + the length along the roof and floor (8 + 8 or 16 ft.) = 32 ft. × 5000 ft.; Velocity = v = 350 ft. per minute as already determined and area = a = 8 × 8 = 64 sq. ft.

$p = \frac{ksv^2}{a} = \frac{0.00000002 \times 32 \times 5000 \times 350 \times 350}{64}$

= 6.125 lb. per square foot. But the total ventilation pressure is desired. That will be 6.125 × 64 = 392 lb., for there are 8 × 8 = 64 sq.ft. of cross-section.

How Much Air Required

Q.—How much air would be needed in Illinois to supply 90 men and 6 animals with the quantity of air required by law?

A.—In a non-gassy mine each man must have 100 cu.ft. per minute, so 90 men will require 9,000 cu.ft. and each animal must have 500 cu.ft. per minute, so 6 animals will require 3,000 cu.ft. per minute, a total of 12,000 cu.ft. In a gassy mine, each man must have 150 cu.ft. per minute. So 90 men will require 13,500 cu.ft. and the animals will require 3000 cu.ft. more. The total requirement in this case will be 16,500 cu.ft. per minute. But the inspector in writing can demand that more be furnished if he believes it necessary.

Q.—Which is more easily ventilated, a slope or a drift mine?

A.—A slope, in winter, may ventilate itself without any fan, for the air which enters the mine heavy and cold gets warm and light in the deep workings and accordingly is easily pushed up the return by the heavier air in the intake. To make the air still lighter, it receives both methane and water vapor, both of them lighter than air. In the summer, the outside air is warm and light, and it becomes heavy after it enters the mine, and the fan has a difficulty in making this heavy air rise in the return, for the light air of the intake is too light to balance the return air, much less to push it up and out.

However, as the average mine temperature always exceeds the average surface temperature, the air usually is lighter and more ready to travel up the return than when it entered the mine. Consequently, it is on the whole easier to ventilate a slope than a drift mine, because the drift mine, unless it has a shaft, never assists the fan in ventilating the workings but leaves all the ventilation to the fan. On warm sunny summer days, however, when the surface air is hotter than the mine air, the mine foreman finds a slope mine difficult to ventilate, but this difficulty is less evident because in normal years mines work less frequently in the summer months than in the winter.

* Continued from p. 108, September, 1944, *Coal Age*.

Coal Age Quiz

Q.—How can ice be removed from a mine?

A.—By reversing the fan, the warm air from the mine interior will melt the ice in the mine approaches, facilitating the passage of air and in a drift the escape of water.

This, however, must be done with caution because (1) the doors in the mine are likely to swing open (details of a door that readily can be reversed are given in U. S. Bureau of Mines, I. C. 7280); (2) if a pressure fan is made by the change into an exhaust, pressures will be decreased throughout the mine and methane will be released from some goafs and gobs and come into the headings; (3) gas will be returned to the areas from which it has been expelled perhaps doubling, for a while, the methane percentages; (4) auxiliary fans, if running, will take return air to the faces and (5) the air being damp will deposit moisture on the roof and perhaps cause roof falls, as it does in the summer when moist air comes from outside the mine. If the haulage has been on the intake, it will now be on the return with all the dangers and disadvantages thus entailed and all the advantages also. The change should be made when no one is in the mine. This reversal may ease the work of the fan, for not only will it dissolve the ice that blocks the passage of air but it may utilize natural ventilation, if any. If the change is to be continued over a day or for several day's operation, the doors will have to be rebuilt so as to close by gravity in the direction of the air current.

Q.—Where should a mine fire be closed first, in intake or return?

A.—If no oxygen breathing apparatus is available there will be no choice, because until the ventilation is cut off in the intake, the atmosphere of the return, containing the smoke and fumes from the fire, will be so foul that no bare-faced man can hope to approach it. Even when the intake brattice has been erected, it will be best for the men building the brattice in the "return" to wear gas masks and be very careful that there is oxygen enough to support life in the atmosphere of what was the return until the intake brattice cut off the air current.

However, as the fire cools by reason of the closing of the intake, it will draw in air from the return or from a crosscut connection with the intake and make it possible to close up the return, which otherwise will admit air to the fire as the heat of combustion declines. See Fig. 1, where an arrow shows "tidal air" entering the return from the intake through a crosscut outby the fire. The brattice has been removed from this passage to provide for the travel of such air.

"Tidal air" is air which, when there is no regular ventilation, moves forward or backward because of changes in density of the surface atmosphere or shrinkage or expansions resulting from cooling or heating respectively. It is "to-and-fro" or "in-and-out ventilation," except that the ins and the outs are separated by relatively long periods of time and are not regular in their occurrence like tides.

However, if oxygen breathing apparatus is available, both intake and return should be shut off at the same time, building the stoppings from the floor up because the work will be done sooner and because, until the two brattices are completed, there will be ventilation for the area being sealed. Thus, the methane beyond the fire and the

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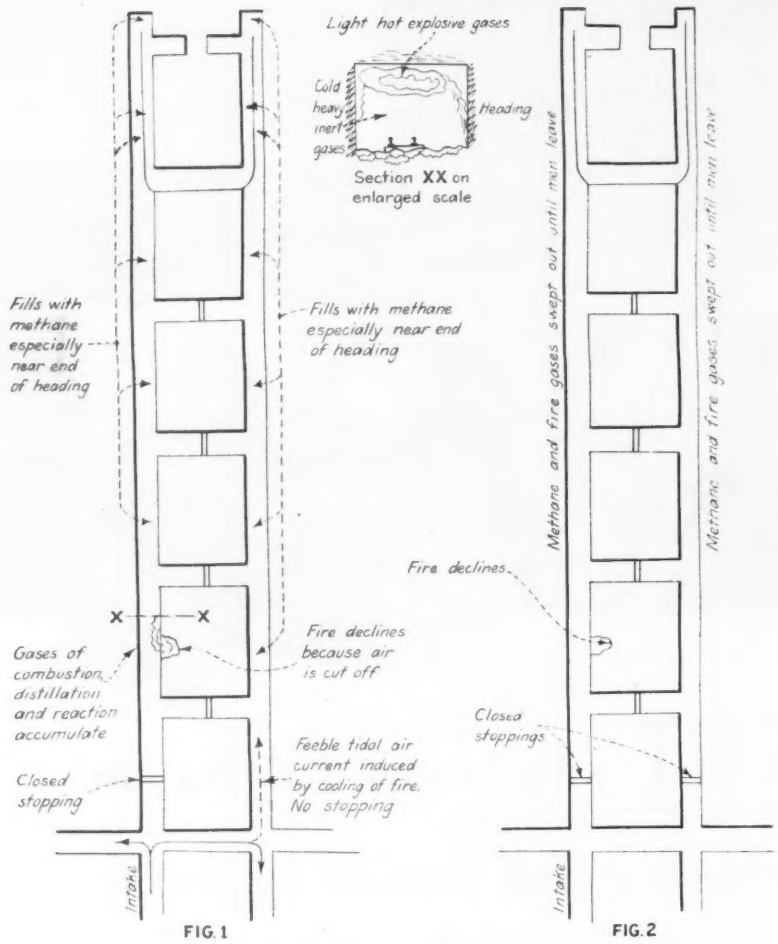

Fig. 1—Methane gathers menacingly as soon as the intake is closed; yet the hardest job remains—closing the return opening when the air is foul. Thus closed, a dangerous percentage of methane will result. Fig. 2—When both stoppings are completed concurrently, the light gases of combustion, distillation and reaction rise and are swept away until the very instant of sealing.

gases escaping from the fire and from the heated coal will be swept out and, when the brattices are completed, there will be a minimum of explosive gas behind the seal, which is what is desired.

More methane will be evolved later and more combustion products (combustible and non-combustible) will be formed, but that increase in combustible gas content, unfortunately, cannot be avoided, but what is important is to start the sealing with as little combustible as possible. Perhaps the placing of the top board in each stopping should be delayed awhile (1) to let the fire die and cool down before the stoppings are entirely closed and (2) to drain out the hot and explosive gases and thus lower the temperature. This would take courage and would be contrary to recognized practice. This obviously is a debatable suggestion. Its purposes are good, but would experience vindicate the theory?

The ventilation both entering and leaving at the roof after the brattices have been built up a distance above the floor will be ventilation that will act largely only on the light gases which rise to the roof, so the methane and explosive fire gases will tend to be removed, leaving the heavier gases like nitrogen and carbon dioxide behind the seals when those stoppings are closed. These heavy non-explosive gases are just what are needed to dampen flame. Where burning, the explosive gases will be hot and light and will cling to the roof, not only because, in some cases, of their intrinsic specific gravity but also because of their high temperature.

It may well be that in this way an almost complete screening of explosive gases and methane from extinctive gases will be effected, and a condition obtained that will make an explosion after sealing almost impossible. When the fire cools, the pressure of the air behind the seals falls and air is drawn in. By completing both seals at one time and thus ventilating up to the last minute, the hot gases are withdrawn and the fire area being thus cooled, less air will be drawn through the seals and the fire will not so readily revive in the period short of the return to tighten the seals.

Why Fire Revives

Q.—What makes a fire revive after it has once died down?

A.—Entry of air and the heat still remaining in the coal. Because a fire is out does not prevent a new fire starting if a sufficient percentage concentration of oxygen is available for a resumption of combustion. The coals may not actually glow, but in places they may be almost hot enough to do so. If the area closed in by the seals is small, the area of exposed roof, coal and floor is small, and the heat cannot be dissipated, so entry of air will renew the fire.

But the fire will often revive when the seals are as tight as ever. How does the air get in? When the seals are first erected the fire is hot and the sealed-in atmosphere is hot, so the air behind the seals is at barometric pressure.

But, when the fire, being deprived of air, dies down, the atmosphere lodged behind the stoppings begins to shrink considerably, and the pressure drops so that a partial vacuum is formed and air enters through the seals. For this reason, the cracks will need to be mudded or cemented and the boards will have to be painted or limed to prevent entry of tidal air. It is well also to paint or lime the roof and the coal for a foot or more near the brattice, so as to prevent the air from bypassing the stoppings by slipping through crevices in the measures.

Q.—How would you extinguish a mine fire if one should develop near the outcrop?

A.—The best way to extinguish a crop mine fire is by stripping the cover, concurrently removing the coal. When a coal seam burns, it lets down the roof and makes crevices in it, and thus the gases of combustion can escape. In consequence, the pressure of the air within the seals is lowered, and the air of the mine, being at a higher pressure, forces its way through the seals.

For this reason the stoppings leak, and a definite ventilating system from the leaking seals or pillars through the inclosure to the surface of the ground is established. This is a continuous circulation, almost impossible to stop. Many such fires have burned for years. Most shallow roofs do not need thus to be creviced. The crevices already are present and from the start trouble is experienced. In some cases, air will enter from the surface at one point, and, passing to the fire and becoming heated, will leave the seam by another route.

Carbon-dioxide gas in cylinders was used in quantity, 230,000 lb. of it, by the H. C. Frick Coke Co. at the Bitner mine fire (*Coal Age*, Vol. 24, p. 3 and 132). Here, however, the cover was too heavy to strip, much of it exceeding 100 ft. The crevices, wherever they could be detected, were stopped with clay. In the anthracite region, sand in one instance was distributed, it is said, over the ground to check, if possible, the travel of the air through the allegedly inclosed area. Here, however, carbon dioxide was not used, except such as was generated by the fire.

The objection to stripping is that it may be slow and in the interval the fire extends in all directions. If the fire is quite close to the outcrop, it can be extinguished in a few hours. When it is deeper and more remote, it will be necessary to check the fire by the erection of stoppings in the normal manner. If the cover is less than 50 ft. thick, and the location of the fire is known, the stripping method seems preferable.

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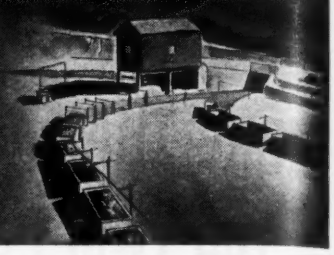


New Journal Mounting Improves Cars

A CHANGE IN THE METHOD of securing journal box bodies to wooden car sills, which makes for better mine-car construction, is being carried out in the Providence shop, The Hudson Coal Co., Scranton, Pa.

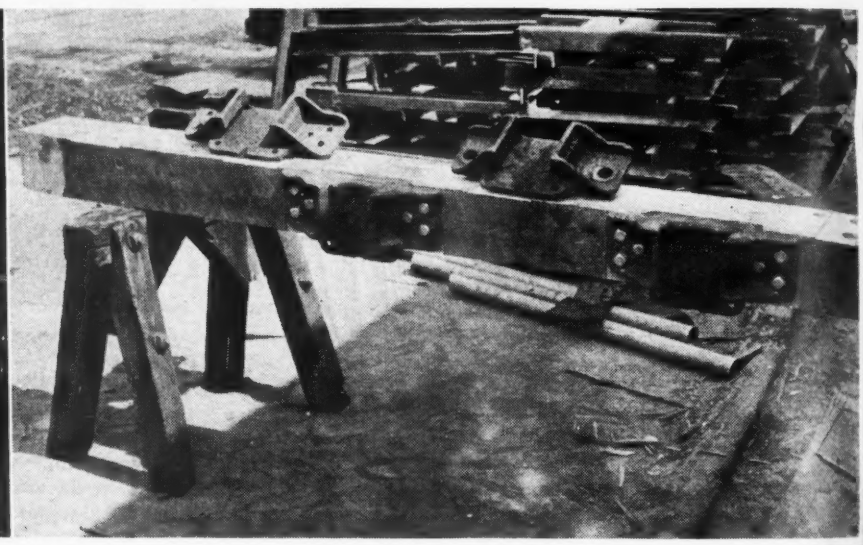
The Type FD44a journal box body, shown in the accompanying illustrations, was formerly bolted to a 6x8-in. by 8-ft. 10½-in. long white-oak sill by two 1⅛-in.-diameter bolts. Now, each journal box body is firmly anchored by six ⅝x4-in. galvanized lag screws, driven-up with an air wrench.

To make this change it is necessary to grind off the boss at each hole, plug the hole with a bronze weld using an acetylene flame, dress both top and bottom surface and drill new holes to accommodate the lag screws.

This new construction eliminates the rocking movement between the journal-box body and the car sill and uses galvanized lag screws, which will not rust away in service.

This new method of attaching the journal-box body to the sill with lag screws does away with the two large 1¼-in.-diameter holes formerly required through the sill and eliminates the danger of weakening the sill.

A two-man crew drives-up the galvanized lag screws with an air wrench.



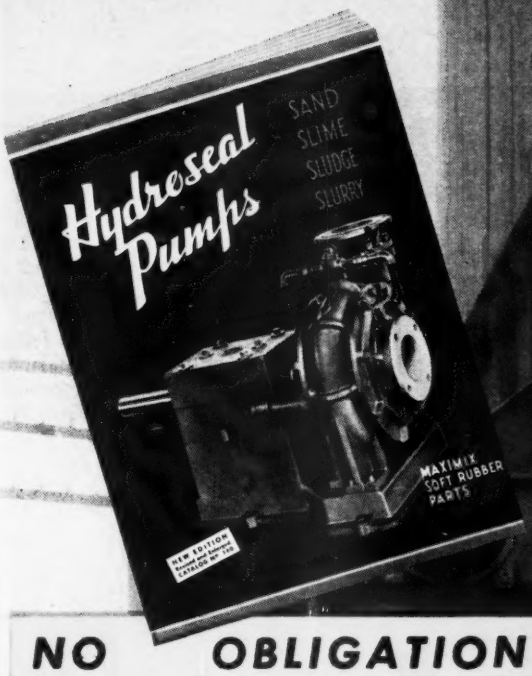
Completed sill with both journal-box bodies mounted in place. Note old type journal-box body and one that has been worked over resting on top of the car sill.

Wearing Strips Bent to Correct Shape in Vise

CORRECT SHAPE "with a twist of the wrist" is assured for journal-box wearing strips by use of dies which convert a large vise to a miniature bulldozer in the blacksmith shop at Powellton Mine No. 3, Koppers Coal Division, Elkridge, W. Va.

Straight pieces of bar steel of the right cross-section, after being cut to exact length, drilled and notched, are heated to red and then with one closing of the vise are formed to proper curvature and with bends at the ends. In the illustration, the vise is being opened after a strip has been bent. The strip is sticking to the back part of the die. These dies, which are for strips for 13-ton MH-110 main-line locomotives, can be lifted off the jaws of the vise.

Vise with dies fitted to jaws is being opened after a heated strip was bent.



NO OBLIGATION
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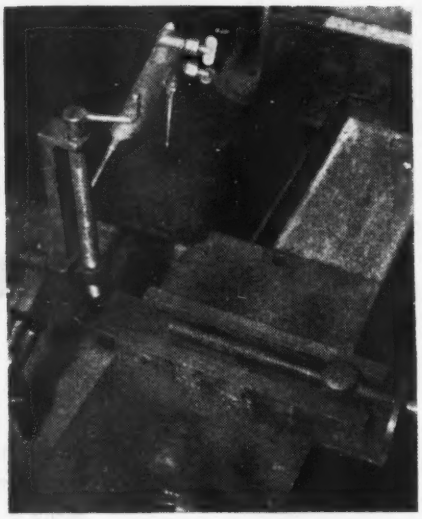
Pumping Rock Refuse with HYDROSEAL PUMPS

Pumping offers the simplest solution to the problem of disposing of refuse from picking table and washer. The discharge pipeline of the Hydroseal Pump can run anywhere, across creeks, roads, ravines and even over a mountain; thus you can easily deposit the refuse so that it need never be moved again. Water used in pumping can be recirculated if desired; further, the rock can be piled as high as you wish. . . . Photos show an installation where mine rock is crushed to pumping size, before it enters the round tank where it mixes with water for pumping to storage pile. . . . Ashcolite Abrasion Resistant Pipe reduces maintenance of discharge line to a minimum. The Hydroseal Principle and Maximix Rubber Parts reduce pump maintenance and power costs far more than you'd think, for such difficult pumping conditions. . . . This is only one of the many coal mine jobs for Hydroseal Pumps. Others include (1) pumping sand or sludge in coal washers, (2) pumping coal in the moving of storage piles or to distant locations for storage or from mine to preparation plant, (3) pumping silt or culm to storage piles, (4) reclaiming culm banks, (5) pumping overburden in hydraulic stripping operations, (6) cleaning muck from reservoirs, underground sumps, shaft bottom sumps and air shaft. . . . Send for our 32-page Catalog No. 140, which explains what's now practical in abrasives pumping.

THE ALLEN-SHERMAN-HOFF CO.
231 S. 15th St., Phila. 2, Pa.
Offices and Representatives in every Coal Mining District in the United States

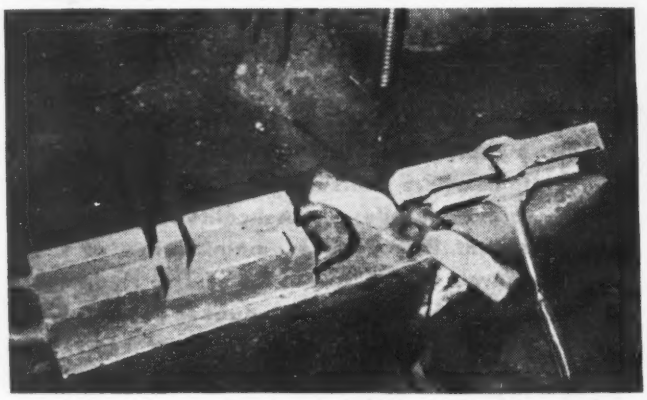
Torch Holder Built at Mine Cuts Irregular Curves

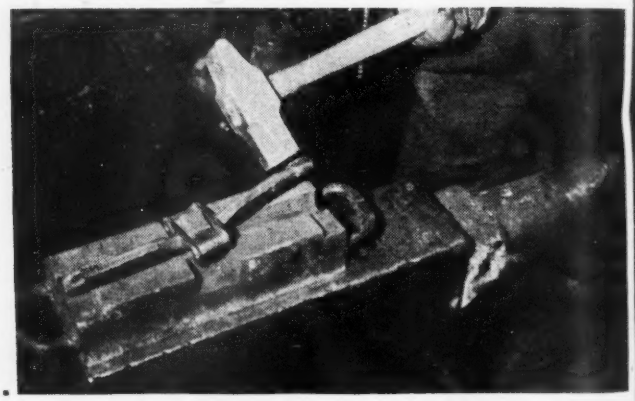


A third crank, for forward movement, is connected to the shaft of the small gear that barely shows at the bottom of the picture.

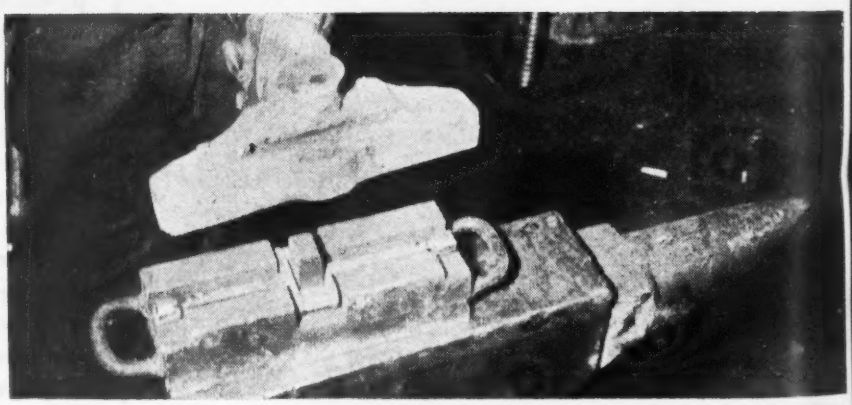
THREE MOVEMENTS—forward, across and vertical—are provided by a cutting-torch holder made locally and in use in the shop at Powellton Mine No. 3, Koppers Coal Division, Elkridge, W. Va. The track is a 2x6-in. channel with the edges of the flanges forming the tails. The two double-flanged wheels at one end of the baseplate are keyed to an axle which is geared to a hand crank. These small gears, helical type, were taken from a Jeffrey A-7 electric coal drill. By manipulating the travel and cross feed simultaneously the cutting may be made to follow any type of curve.

Conveyor Flights Straightened Quickly and Accurately





Clockwise: A bent flight lying on the anvil between the two swages; Bending the flight back far enough to start it into the swage; Bringing the top swage into position; Hammering to effect final straightening.



TOOLS FOR quickly restoring to original shape the flights for Type 61 A.M. chain conveyors are shown in the series of four illustrations made in the shop at Powellton Mine No. 4, Koppers Coal Division, Elkridge, W. Va. These tools won for mechanic L. O. V. Eads a $25 prize at the gadget show held at Montgomery last fall by the Kanawha Valley Mining Institute.

The tools consist of two swages one of which is placed on the anvil and the other placed on top of the work and hammered. The latter has a handle and top projection to receive the blows. As indicated by the second illustration, a badly bent flight must be given a preliminary straightening so it will enter the anvil swage. Placing the top swage over it and hammering vigorously completes the job.

HAZARD HAS SUCCESSFULLY ADAPTED

SYNTHETIC RUBBER

to these MINING CABLE INSULATIONS

Hazard Submarine Rubber Insulation — Long-time water immersion tests, accelerated aging tests in the air oven and oxygen bomb, together with insulation resistance and dielectric strength tests, certify to the excellence of Hazard Submarine rubber insulation made with Buna S for use under moist conditions.

Recommended for Borehole and Shaft Power and Signal Cable, and Inside Power Cable where moisture resistance and long life are of high importance.

Performite Heat-resisting Insulation — This super-aging rubber compound, according to all available tests, has a life expectancy equal to Performite insulation made with crude rubber. The 75°C. copper temperature rating provides more than ordinary carrying capacity. It meets the requirements of ASTM Specs. D-754.

Hazasheath Jacket — A tough protective jacket made with Buna S synthetic rubber is mold-cured under heavy pressure for greatest possible density, toughness and moisture resistance. Lighter and easier to handle than lead sheaths on Borehole Cable or Inside Feeder Cable.

Hazaprene Jacket — Tough mold-cured Hazaprene jackets compounded with neoprene synthetic rubber are not only abrasion-resistant, but also resistant to the destructive action of oil and grease. Hazaprene jackets are standard on Hazard Portable Mining Cables.

Engineering Service: Advice on any particular installation will be gladly given by the Hazard Engineering Department. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pennsylvania.

The Use of Synthetic Rubber

Hazard has had notable success in adapting Buna S synthetic rubber to cable insulation for the exacting needs of the mining industry in order to replace natural crude rubber. In a remarkably short period of time, intelligent research has resulted in the production of insulating and jacket compounds that efficiently replace those formerly made with natural crude rubber. Hazard cables made with these insulations can be used with confidence.

ARMY E NAVY

HAZARD

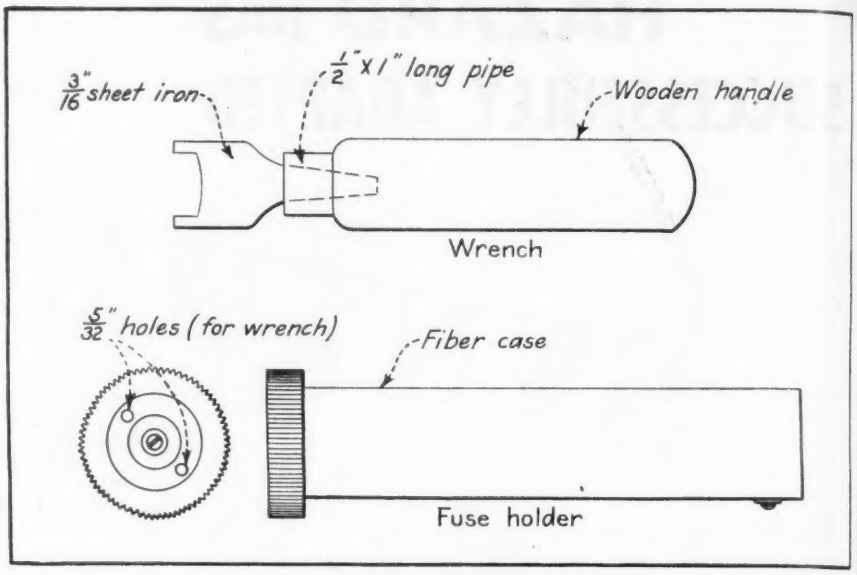
INSULATED WIRES AND CABLES FOR EVERY MINING USE

Spanner Wrench Speeds Fuse Renewal

A SHOP-MADE SPANNER WRENCH now makes it easier to remove the screwed brass base from a fiber fuse holder located in the handle of a Chicago Pneumatic drill, declares E. C. Hitchcock, night electrician, New River Co., Summerlee, W. Va.

Experiencing difficulty in unscrewing the base with the tips of the thumb and fingers, particularly after the equipment had been in service for a long period, led to the drilling of two $\frac{5}{32}$-in. holes and the development of a spanner wrench to do the job. The accompanying sketch shows how it was accomplished.

A prolonged fuse outage means a delay for the machine operating from that fused circuit. The application of this sample wrench, says Mr. Hitchcock, has both simplified and speeded up the task of replacing fuses in this type fuse holder.

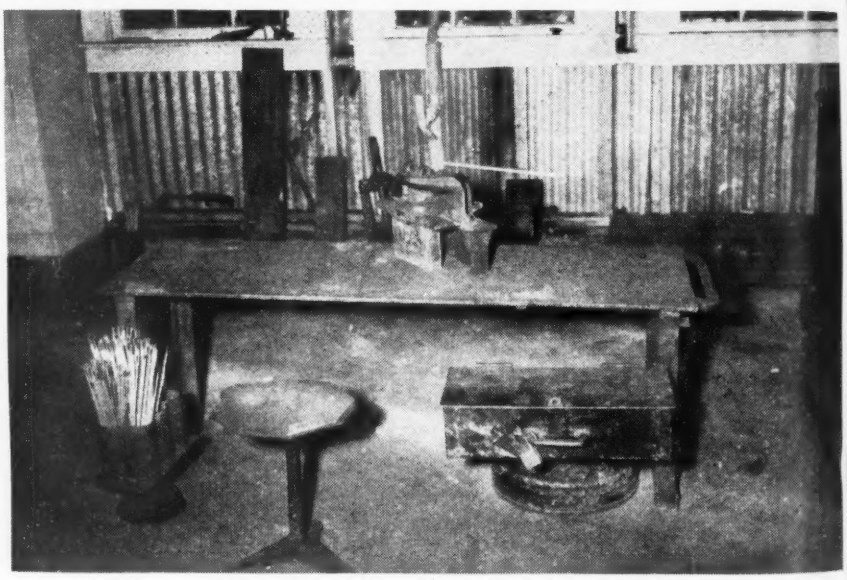


Outline of wrench and how it is used to dismantle fuse holder.

Welding Bench Built for Greatest Convenience

CONVENIENCE goes a long way toward assuring good workmanship and time saving. The welding bench shown in the illustration is the design of L. O. V. Eads, mechanic working in the shop of Powellton Mine No. 3, Koppers Coal Division at Elkridge, in Fayette County, W. Va. Contrary to the appearance in the illustration, the locked tool box is not sitting on the small tube, which is a receptacle for electrode tips. The box is hinged to the table leg and when not in use is pivoted back under to a crosswise position.

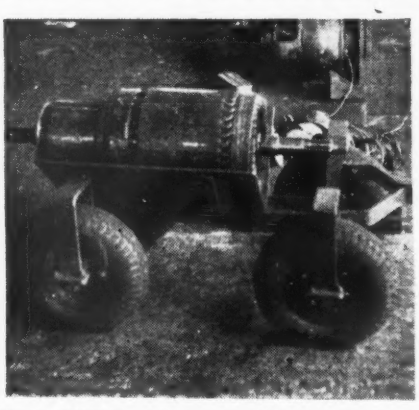
Likewise the six-pocket electrode holder is hinged to another leg and it also can be swung back under. The metal table top is permanently "grounded" to one terminal of the welding machine. Cable to the electrode holder, which is hanging above a piece of work on the center of the table, is carried overhead on pulleys. Thus, it is not where it will be tripped over and can be pulled down to the right adjustment for flexibility with relief of weight.



All tools for the welding job are within reach.

Truck Facilitates Armature Handling

HANDLING heavy armatures from one section of the shop to another without damage is made easy with the well-designed, substantial truck illustrated. The V-bed insures that the armature will keep its place even when pulled over car tracks and rough floors. The rubber "wheelbarrow" wheels are one of the secrets of the effectiveness of this handy shop tool.



Armature truck welded from shop scrap.

Good News?

Bad news travels speedily. Good news needs a shove. Why not shove along some recent novel and tried operating idea which you have put to work? Include a photograph or sketch if it will help. For each acceptable idea, Coal Age will pay $5 or more on publication.

STARTED IN 1937

National Powder Company Started Manufacturing Industrial High Explosives in 1937

● National Explosives that have been manufactured since that time for the general contractor, for the contractor sinking shafts, driving tunnels, or grading, comprise a complete and full line of dynamites and gelatins. Explosives for coal and metal mines, cement, limestone, gypsum, talc, mica, mines and quarries are all part of our job.

Starting from scratch early in 1937 our growth is indicated as shown in the table below. This table represents pounds of National Dynamites manufactured and sold year by year.

1937	1938	1939	1940	1941	1942	1943
1,170,000	2,800,000	4,000,800	5,500,000	6,100,000	7,700,000	10,200,000

We are a company not ten years old but with an experienced personnel in the manufacturing of industrial explosives.

"NOT LIVING ON OUR REPUTATION BUT BUILDING IT"

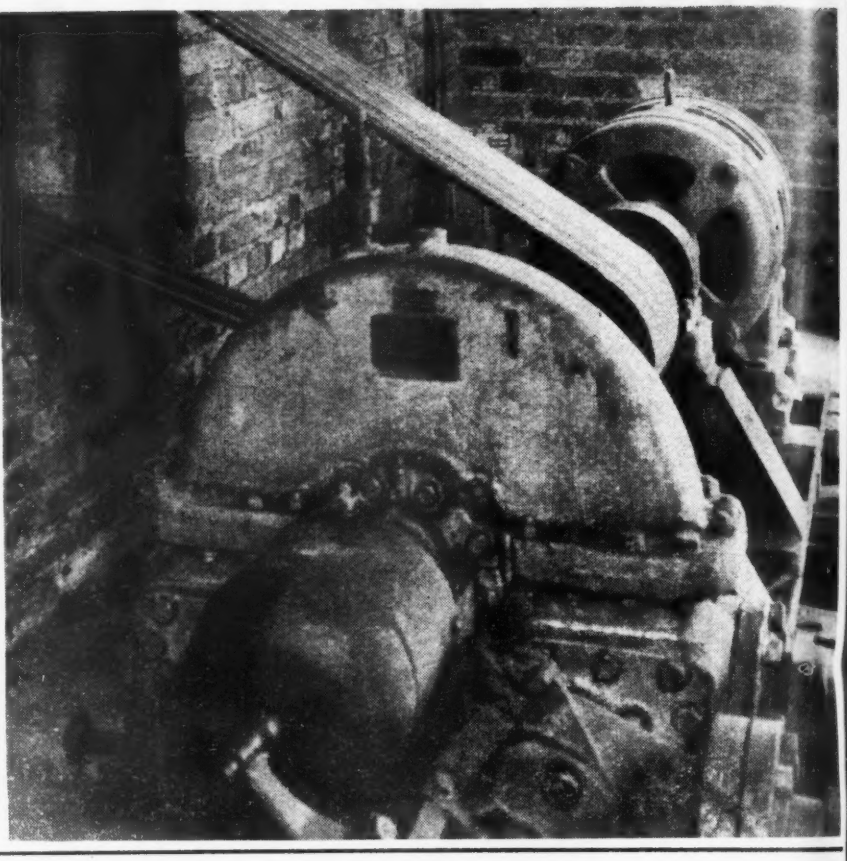
National POWDER COMPANY

LDRED • McKEAN COUNTY • PENNSYLVANIA

Dual Fan Drive Assures Continuous Ventilation

CONTINUOUS VENTILATION of coal mines is important from the standpoints of health, safety and the law, even though the release of explosive or poisonous gases may be so low that they present no hazard. Practical assurance of continuous fan operation is maintained with two sources of power at the fan. The Harmony mine of the Lincoln-Summit Coal Co., near Sullivan, Ind., which is driven by central-station power, has solved this problem by using steam from the heating plant to supply a mechanical-drive turbine.

The dual power unit consists of a 60-hp. squirrel-cage 1,750-r.p.m. motor mounted on the same base with a matching mechanical-drive steam turbine. Mounted between the two power units is a V-belt pulley provided with two flange couplings by which either unit may be coupled to it. In case of a power failure, change is made to the turbine in a few minutes by shifting the coupling bolts. The motor control is arranged to make the power transfer automatic if found desirable. In that case the power units are both coupled to the pulley.



Dual drive for mine ventilating fan. Change from motor to turbine is by transfer of coupling bolts.

Anthracite Replaces Coke in Cupola

FOR SOME TIME, anthracite (egg) coal has been used in place of coke to charge the foundry cupola at the Providence shop of The Hudson Coal Co., Scranton, Pa.

To substitute anthracite coal for the coke portion of the charge more air was needed. The tuyères leading the air from the wind belt into the smelting zone were revamped to permit the passage of more air. An old blower was replaced by a larger unit driven by a wound-rotor motor through a V-belt drive. A drum controller for the motor provides for changing the speed of the blower within definite limits.

In charging the cupola a 100-lb. layer of anthracite, an 800-lb. layer of scrap iron and a 200-lb. layer of pig iron go to make up a unit charge. This unit charge is duplicated to provide the iron necessary for the run desired.

In operating this cupola on such short runs, says John Stewart, foreman, it is not necessary to use a flux such as limestone in the cupola charge.

Part of the 13,000-lb. run being poured into the mold for a machine casting.

John Stewart, foundry foreman, supervises the charging of the cupola with anthracite (egg) coal.

Shop Tool Saved Its Cost Six Times in Two Years

ANY TOOL that saves its first cost every four months certainly demonstrates its value. That is the conservative estimate of performance of a metallizing gun purchased by the West Virginia Coal & Coke Corp. two years ago for use in the central repair shop at Omar, W. Va. Shafts formerly scrapped and replaced with new ones are now repaired for $10 or less.

Most of the jobs being done with the machine fall into one of three principal classes. These are discussed separately and in the order of their importance—that is, greatest annual return, which is dependent on the number of items repaired and the savings on each—in the material which follows.

(1) Journal and axle-cap wearing surfaces of locomotive axles, both main-line and gathering, are built up by metallizing. It requires a finished thickness of at least $\frac{3}{16}$ in. of the sprayed metal to give the coating or shim sufficient strength and wearing depth for this service.

(2) Armature shafts for both sleeve and ball bearings are restored. For this duty not less than $\frac{1}{8}$ in. of finished sprayed metal is used. The shaft shown in the series of illustrations is from the Reliance motor of a Joy 11BU loading machine. One of these shafts with a scored and worn ball-bearing fit costs less than $10 to repair compared to a cost of approximately $75 for a new one.

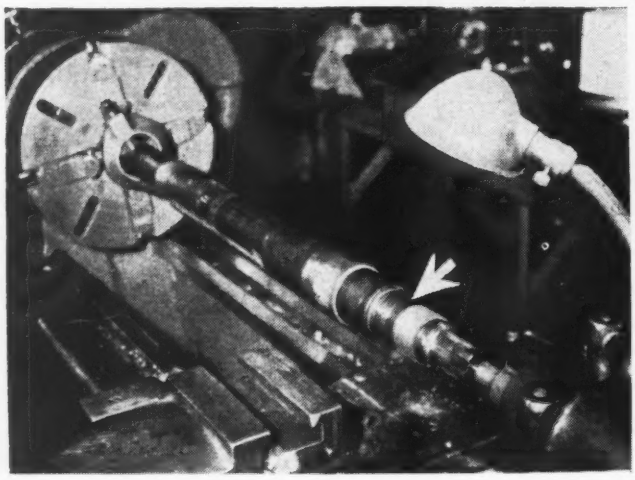
(3) Larger shafts, such as those used in preparation plants and tipples, likewise are built up where worn by sleeve bearings.

Foreseeing the possibility of repairing locomotive axles and armature shafts, a number of worn ones had been saved instead of junking them or using for making smaller shafts. Usually it is the practice to prepare three or four shafts or axles and wrap the prepared sections in paper so that with one set-up of the gun several shafts can be metallized.

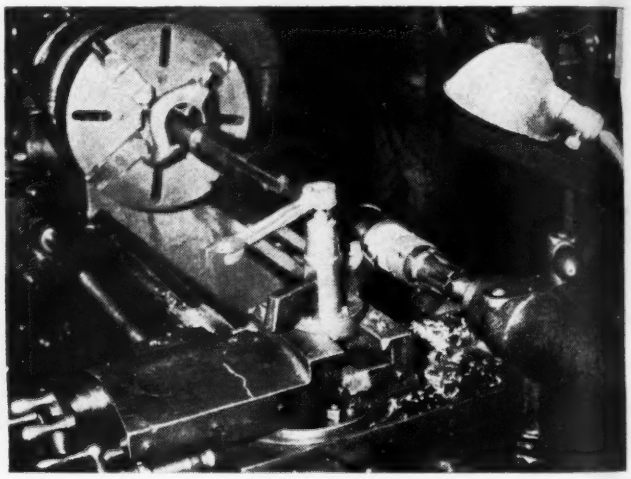
In repairing locomotive axles one exception is made. The axles of an old type outside-frame locomotive are not metallized. Apparently these were built too small in the first place and the preparation for metallizing would weaken them beyond a practical limit.

After the section of the shaft to be metallized is turned down the required $\frac{1}{8}$ or $\frac{3}{16}$ in., a square thread, twelve to the inch, is cut on that section. To make dovetail anchorages for the deposited metal a knurling tool is run over the threads to about half close the tops of the grooves. A few layers of tape applied around the shaft to mask off the adjoining sections completes the preparation.

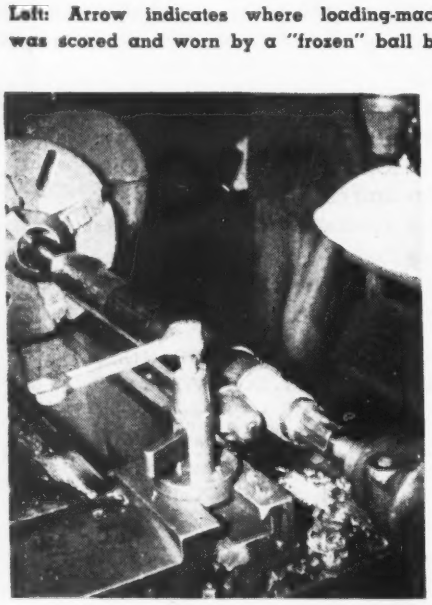
For the usual work in building up shafts the steel rod fed to the gun has a 0.25 carbon content. Heating of the shaft is so slight that the friction tape masking adjacent sections is not burned and it is possible immediately after a build-up to bear the hand on the shaft within 6 in. of the metallizing.



Left: Arrow indicates where loading-machine armature shaft was scored and worn by a "frozen" ball bearing.

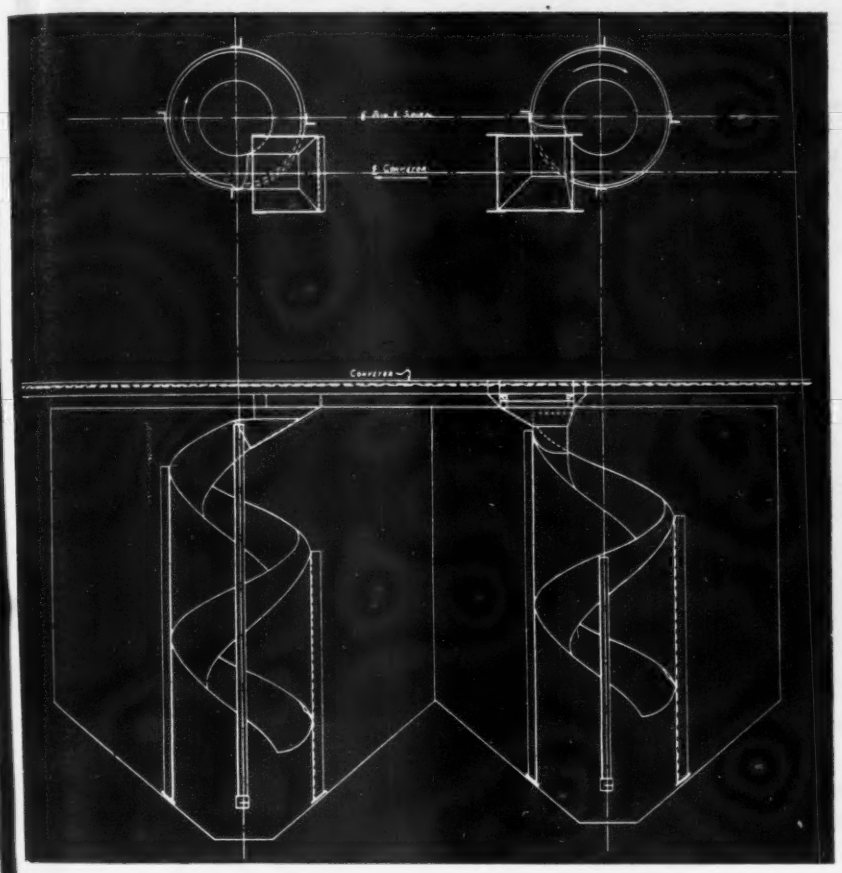


Right: Cutting off ⅛ in. to provide thickness for the sprayed metal shim.



Left: A square thread (twelve per inch) was cut on the part, and now a knurling tool is being run over top to impart an irregular dovetail form to the slots. Center: Applying the shim by spraying on 0.25-carbon steel. Right: After the masking tape is removed and the bearing fit machined and polished, the shaft will again be ready for service.

AVOID BREAKAGE *with*



Holmes Lowering Spirals

The advantage of Holmes' spiral over previous chutes of this nature lies in the design of the carrying surface, which is formed much as the bowl of a race-track, having no retaining wall on the inside edge. Elimination of this inside edge allows the material to slide gently onto the peak of the pile without droppage. By the same token, the peak of the pile may be carried around the interior of the bin in such a manner that the material is deposited in overlapping layers, where the problem of segregation is present.

Design is such that the lowering speed of the material is automatically retarded when it begins to exceed a safe limit. Regardless of the distance the material travels, its velocity remains uniform; and it reaches the bottom in a continuous, even stream.

ROBERT HOLMES AND BROS., Inc.
DANVILLE, ILLINOIS
DESIGNERS AND FABRICATORS OF MINING EQUIPMENT FOR OVER 70 YEARS

CINCINNATI CHAINS, BITS AND BARS ARE PREFERRED BY MINERS AND OPERATORS

DEEP down in thousands of mines is an army of men who devote their lives to mining coal. The Cincinnati Mine Machinery Company and its personnel has devoted a lifetime to providing these men with well-engineered, tough, trouble-free coal cutting equipment. Cincinnati Chains, made of high-grade alloy steel, heat-treated and drop-forged, are preferred by machine runners because they can produce maximum tonnage with minimum effort. Repair and maintenance men say Cincinnati Chains give less trouble and are easier to service. Popular, too, is the long life, sturdy, double-ended, reversible Duplex Bit.

This long-life replaceable hardened alloy steel Connector Insert gives new factory joint accuracy to worn connector.

Easily removed alloy steel heat-treated Rivet holds Bearing Pin against longitudinal displacement.

Hardened Eccentric Pin is designed so it can't turn in block . . . placing joint wear between pin and insert.

THE CINCINNATI MINE MACHINERY CO.

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COAL AGE NEWS ROUND-UP

Government Mine Seizures Mount As Bosses' Union Presses for Contract

EFFORTS of members of the foremen's union of the United Mine Workers of America to force recognition as a bargaining unit continued in September, followed in many cases by additional seizures of mines by the government in Pennsylvania, Kentucky and West Virginia. Developments included grand-jury proceedings to indict leaders at some properties in Pennsylvania where stoppages were called after seizure; scattered strikes to force foremen to unionize at several properties; and attempts by the union to further confuse the situation by serving notices of strikes at properties where no supervisors had been enrolled.

Legal steps to halt the holding of strike votes and also attacking the jurisdiction of the War Labor Board and the National Labor Relations Board were taken in the Federal Court at Washington Sept. 25 by a group of southern operators. Accusing the two agencies of "sanctioning and encouraging" organization of the foremen, the eight companies, all members of the Southern Coal Producers' Association, asked for injunctions to restrain NLRB from taking additional strike votes and to restrain WLB from holding hearings on cases now before it. Stating that the foremen's union is an "integral part" of the United Mine Workers, the operators said that attempts at organization violated the terms of the wage agreement of April 1, 1941, which specifically exempts supervisors from its jurisdiction. The plaintiffs included the Anchor Coal Co., American Eagle Colliery Co., Birchton Coal Co., Gulf Mining Co., Hatfield-Campbell Creek Coal Co., Princess Dorothy Coal Co., Sterling Smokeless Coal Co. and the Truax-Traer Coal Co.

Requests that NLRB take strike votes at the 37 properties yet unseized (see accompanying tabulation) were withdrawn by the supervisors' union Sept. 30. Following this, the petition to restrain WLB and NLRB was withdrawn by the operators Oct. 3. They reserved the right, however, to reinstate it if either board resumes proceedings in the case.

John McAlpine, president of the United Clerical, Technical and Supervisory Work-

STRIKE NOTICES, VOTES AND SEIZURES IN CAMPAIGN TO ORGANIZE SUPERVISORS

Coal Properties Listed in Union Strike Notices Filed to Sept. 4	Strike Vote "Yes"	Strike Vote "No"	Date Seized by Government
ALABAMA			
Black Diamond Coal Mining Co	..	..	.....
Galloway Coal Co	..	..	.....
Republic Steel Corp	..	..	.....
KENTUCKY			
Eastern Coal Corp., No. 17	12	0	Sept. 15
Octavia Coal Mining Corp., Octavia	11	1	Sept. 15
PENNSYLVANIA			
Castle Shannon Coal Co	..	..	.....
Consumers Mining Co	3	25	.....
Culmerville Coal Co	..	..	.....
Ford Collieries Co. (two mines)	26	13	Sept. 1
H. C. Frick Coke Co., National 1 and 2	..	..	.....
Heisley Coal Co	36	24	Sept. 4*
Hillman Coal & Coke Co., Oakmont	9	2	Sept. 6
Imperial Coal Corp., Imperial Cardiff	3	3	Sept. 4*
Maher Coal Co	..	..	.....
Monroe Mining Co	27	20	Sept. 4*
Northwestern Mining & Exchange Co., Kramer	21	3	Sept. 6
Park Coal Co	..	..	.....
Pine Run Coal & Coke Co	..	..	.....
Pennsylvania Coal & Coke Corp., Nos. 3 and 8	25	10	Sept. 6
Nos. 21 and 22	18	3	Sept. 6
Pittsburgh Coal Co. (four mines)	..	..	.....
Republic Steel Corp., Russellton	11	9	Sept. 6
Rochester & Pittsburgh Coal Co., Sagamore	6	13	Sept. 1
Ernest	38	29	Sept. 1
Kent Nos. 1 and 2	21	19	Sept. 1
Kent No. 4	2	10	Sept. 1
Lucerne	11	24	Sept. 1
Waterman No. 2	11	16	Sept. 1
Yatesboro	18	10	Sept. 1
Springfield Coal Corp	0	2	Sept. 4*
Springfield Coal Corp	2	0	Sept. 4*
Union Collieries Co., Oakmont	9	7	Sept. 6
Renton	11	20	Sept. 6
Vesta Coal Co	..	..	.....
Vinton Coal & Coke Co	..	..	.....
Westmoreland Mining Co	..	..	.....
WEST VIRGINIA			
American Eagle Collieries Co	..	..	.....
Amigo Coal Co	..	..	.....
Anchor Coal Co	..	..	.....
Birchwright Coal Co	8	4	Sept. 12
Birchton Coal Co	..	..	.....
Brook, Inc., No. 4	11	6	Sept. 12
Buckeye Coal & Coke Co	..	..	.....
Cannelton Coal Co. (Nos. 3, 5 and 6)	15	2	Sept. 12
Canyon Coal & Coke Co	..	..	.....
Christopher Coal Co., No. 2	4	3	Sept. 12
No. 6	1	2	Sept. 15
No. 3	4	15	Sept. 12
Consolidation Coal Co., Mine 25	6	2	Sept. 12
Mine 32	3	6	Sept. 19
Mine 63	2	7	Sept. 19
Mine 93	4	7	Sept. 19
Mine 97	2	7	.....
Crab Orchard Improvement Co., Nos. 5 and 6	7	22	Sept. 15
Crystal Block Coal Co	..	..	.....
Davis-Wilson Coal Co., Bunker	5	9	Sept. 12
Glen Alum Coal Co	..	..	.....
Glendale Gas Coal Co., Alexander	13	6	Sept. 6
Gulf Mining Co	..	..	.....
Hatfield-Campbell Creek Coal Co	..	..	.....
Hitchman Coal & Coke Co., Hitchman	9	0	Sept. 6
Industrial Collieries Corp., Mine 21	4	9	Sept. 15
Mine 41	22	12	Sept. 15
Mine 42	0	2	Sept. 15
Mine 43	9	11	Sept. 15
Jamison Coal & Coke Co., No. 8	5	2	Sept. 12
No. 9	0	11	Sept. 19
Kelleys Creek Colliery Co., Maiden	25	6	Sept. 6
Koppers Coal Div., Federal No. 1	32	21	Sept. 12
Stotesbury No. 8	3	17	.....
Glen White	0	9	Sept. 19
Leccony Smokeless Fuel Co., Besoco	2	0	Sept. 15
Lillybrook Coal Co., Affinity	2	2	Sept. 19
Killarney	5	3	Sept. 15
Lillybrook	8	2	Sept. 15
Big Stick	1	6	Sept. 19
Lloyd Coal Co	..	..	.....
MacAlpin Coal Co	..	..	.....
C. H. Mead Coal Co. (Nos. 2, 3 and 6)	19	3	Sept. 15
Milburn By-Products Coal Co	2	2	.....
Minds Coal Mining Corp	..	..	.....
D. H. Prichard	..	..	.....
Princess Dorothy Coal Co	..	..	.....
Puritan Coal Corp	..	..	.....
Pursglove Coal Co., No. 2	6	9	Sept. 12
Rail & River Coal Co	..	..	.....
Raleigh-Wyoming Mining Co., Edwight Nos. 1 and 6	3	2	Sept. 19
Glen Rogers No. 2	22	6	Sept. 15
River Seam Coal Co., Booth No. 2	2	2	Sept. 15
Sterling Smokeless Coal Co	..	..	.....
Truax-Traer Coal Co	..	..	.....
Valley Camp Coal Co., No. 1	10	0	Sept. 6
No. 3	17	7	Sept. 6
No. 4	2	0	Sept. 6
Virginia & Pittsburgh Coal Co., Morgan	3	3	Sept. 15
Wyatt Coal Co	6	3	.....
Wyoming Coal Co., Wyco	8	4	Sept. 15

* All mines of company seized. In later seizures, only those properties affected by stoppages or threats of stoppages have been taken over.

"Inventing's his hobby."

ers' Union, sent telegrams Sept. 1 to President Roosevelt and Secretary Ickes pointing out that "we assume in complying with this [seizure] order that the United States Government will protect the interests of our people and guarantee them their constitutional right to be represented by a union of their own choosing, and to grant them recognition of the union and a contract for the duration of government control." Government authorities, however, continued in their stand that since the issues were in the hands of the proper agencies for settlement they had no basis for negotiating at seized properties.

At the same time the supervisory union declared that its back-to-work agreement applied "only to those mines mentioned in the telegrams. Other mines affected by the strike votes already taken and those pending will continue until an agreement is reached with the coal operators or until the government takes over the mines."

In addition to earlier seizures, the government, on Sept. 6, took possession of 15 mines in Pennsylvania where strikes by supervisory employees had halted production; 12 more were seized in West Virginia Sept. 13; 19 in West Virginia and Kentucky Sept. 15; and 9 more in West Virginia Sept. 19. A large proportion of the employees of these operations, however, started back to work under government direction shortly after federal seizure.

A panel of three members was appointed Sept. 16 by the War Labor Board to hold hearings in the disputes between operators in Pennsylvania, West Virginia, Kentucky and Alabama and the supervisory employees' union. The panel members are William W. Latimer, chairman; Charles Gregory and Lloyd G. Reynolds. The first hearing was scheduled for Sept. 25, with the panel instructed to make a factual report on issues exclusive of bargaining rights and charges of discrimination. Mr. Latimer has been chairman of the U. S. Retirement Board since 1935, while Mr. Gregory, professor of law, University of Chicago, and Mr. Reynolds, professor of economics, Johns Hopkins University, both have served on board panels.

The WLB panel held its first hearing (on procedure) in Washington Sept. 25, listened to contradictory claims as to its jurisdiction and points at issue and then recessed without action or indication of its future course. John McAlpine, president, United Clerical, Technical and Supervisory Employees' Union of the Mining Industry, Division of District 50, United Mine Workers, declared that the primary issue was collective bargaining and that since WLB had left that to the National Labor Relations Board he felt that the panel had nothing to do. He declared that the only action that would satisfy him was an order directing recognition of his union as the representative of the supervisory employees.

Representing a number of southern operators, Senator Burke, of the Southern Coal Producers' Association, declared that he had no suggestion as to procedure in view of the stand of the union officials. He further stated that none of the companies represented by him had had a single one of the alleged grievances brought to their attention either by the supervisors or the union.

Before being halted by the panel chairman on the ground that the points he was raising were not relevant at a procedural hearing, Charles O'Neill, in behalf of operators members of the Appalachian Conference in Ohio, Pennsylvania, West Virginia, eastern Kentucky, Tennessee, Virginia and Maryland, charged that the action of the union constituted a breach of the contract and a "violation of good faith on the part of the international union, United Mine Workers of America, and its officers."

•

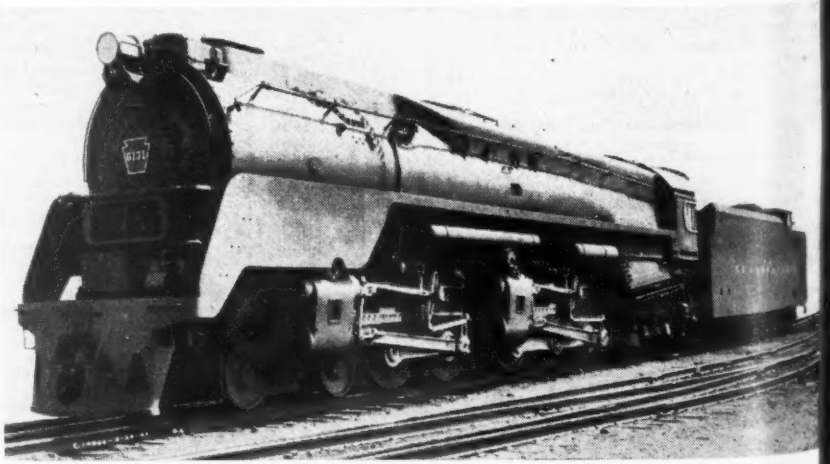
25 High-Speed Steam Locomotives for P. R.R.

The Pennsylvania Railroad announced on Sept. 15 that it had placed in production a new steam locomotive for high-speed freight service capable of drawing a train of 125 cars at speeds in excess of 50 m.p.h. One already has been delivered and 24 more are being built at the railroad's Altoona (Pa.) shops for delivery late this year.

The railroad said the new locomotive was being built to accelerate wartime freight movements, and listed as two of its advantages that it would move trains faster on the road and would make longer continuous runs. The tender will carry 40 tons of coal and 19,000 gal. of water, and additional water can be scooped up while running.

The locomotive and tender are 246 ft. 7 in. over all, 16 ft. 5 in. high. It develops a tractive effort of 114,860 lb., 78 percent more than the standard high-speed freight locomotive now in service on the Pennsylvania, and high pulling power is maintained up to 70 m.p.h.

The locomotive is essentially two engines harnessed together in a rigid frame.



New type steam locomotives being built by the Pennsylvania R. R. in its Altoona shops will draw wartime trains of 125 loaded cars at speeds exceeding 50 m.p.h.

Four cylinders are used, of which the front two drive two pairs of driving wheels and the second two provide the power for three pairs of driving wheels. There is a four-wheel leading truck and a four-wheel trailer truck, incorporating a booster engine to provide extra starting power. The tender has 16 wheels.

The new design, identified as Type Q2, is an outgrowth of Pennsylvania's several years' experience with speed, power and economy of multi-cylinder locomotives. Economy of operation and maintenance are claimed for the new design, as well as less wear on track, since additional cylinders permit a substantial reduction in the weight of driving and connecting rods.

The driving wheels are 69 in. in diameter, steam pressure is 300 lb. per square inch. The locomotive in working order weighs 598,000 lb. and the loaded tender 430,000.

Further Demands Approved by U.M.W. At 38th Union Convention

ENLIVENED by a rupture of relations with Secretary of the Interior Harold L. Ickes, the 38th constitutional convention of the United Mine Workers of America, held at Cincinnati, Ohio, Sept. 10–20, officially condemned the New Deal, beat down attempts to secure greater district autonomy and served notice of intention to wring additional concessions from the operators, including the right to use coal miners and the coal industry as clubs in forcing organization of other industries.

Declaring that President Roosevelt had "publicly kicked every coal miner in the face," John L. Lewis successfully led the convention into adopting a resolution condemning the present administration and praising Thomas E. Dewey and the Republican platform.

Attempts of Ray Edmundson, recently resigned Illinois provisional president, to obtain greater autonomy for U.M.W. districts and also to get himself recognized as a candidate for union president in the next election, were overridden by Lewis and the convention, which indorsed a proposal that the Edmundson faction be investigated as a "dual union." The convention also approved four-year terms for officers and extended the interval between constitutional conventions from two to four years, with biennial conventions for policy and scale purposes. With no other candidate on the ballot, Lewis therefore will be unopposed in the new union election to be held in December.

The union also continued its attacks on the operators for alleged failure to promote mine safety, with Lewis declaring that "the time is going to come in this country when our union will have to take more action to abate this slaughter of our people. Were this war not now on and were the need for coal not so imperative, I would be prone to recommend to this convention that the mine workers of this country would stop coal mining for a time until they could receive assurances from the mine operators of a greater degree of safety."

Safety also figured in an exchange of caustic telegrams between Secretary Ickes and the convention. Addressing Lewis on Sept. 18, Secretary Ickes called attention to production losses growing out of strikes in the campaign to organize supervisors. "Therefore, I call upon you to see that the miners who are now out on strike return to their jobs immediately and that all members of the United Mine Workers of America refrain from strikes at least for the duration of the war in order that prosecution of the war will not be further impaired."

Attacking the administration and the chairman of the War Labor Board in a sarcastic reply approved by the convention, Lewis declared that "the clerical, technical and supervisory employees in the mines are getting a rotten deal from the government," and charged the government with failure to promote safety by not pressing operators to follow the recommendations of federal inspectors. Such a step, said Mr. Lewis, "will help a lot and will restore confidence to thousands of mine workers who now have no confidence in the non-union supervisors, who are joining with the coal operators and agencies of the government to fight our union."

Returning to the attack, Secretary Ickes, on Sept. 20, declared that "what I would like to know is whether you as president of the U.M.W. propose to live up to your long-vaunted role of abiding by your contracts or whether it is your purpose to evade compliance with your contract by beating the devil around the bush in the form of Local No. 50."

In a reply again approved by the convention, Lewis termed the request an "insult," pictured Ickes as a "political officeholder grown fat in public office," and again brought up the subject of safety.

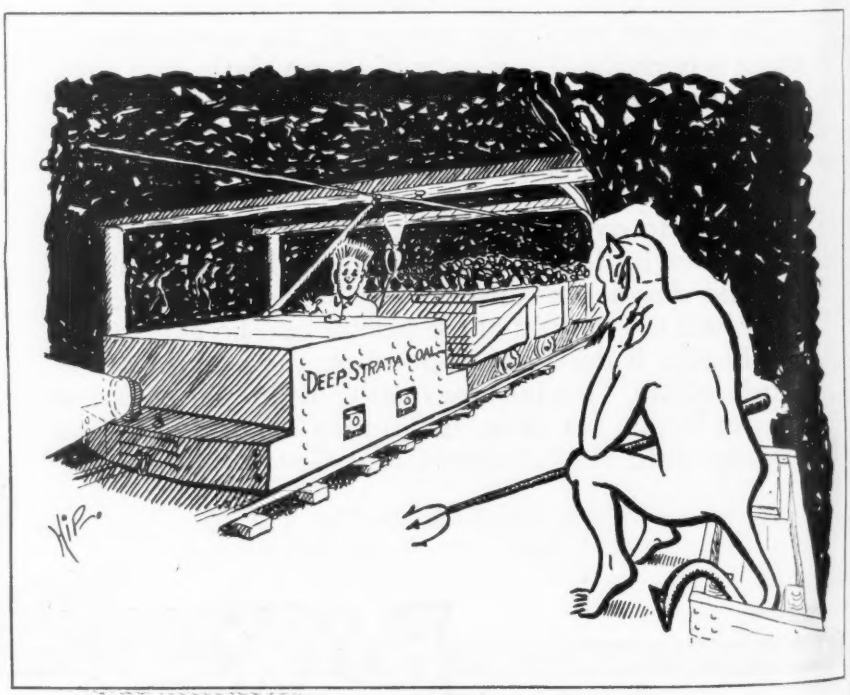
The report of the scale committee wound up the convention. Anthracite scale matters were referred to the Anthracite Tri-District Convention scheduled to meet in March, 1945. The seven recommendations for the bituminous fields included a suggestion that the question of wage increases be left to the policy committee "with authority to deal with all matters involved in making the next basic wage agreement." It was expected, however, that the union would ask for an increase of $1 to $2 per day, since news that two WLB panels would submit reports paving the way for relaxation of the Little Steel formula brought statements from union officials that the present contract would be reopened immediately if such a step were taken and that the miners probably would ask for $1 to $2 more at that time. Other scale-committee recommendations included:

"Continuation and improvement through the medium of collective bargaining of a basic national wage agreement for the bituminous coal industry.

"Abolition of all discriminatory tonnage or day-wage differentials existing within or between districts and . . . uniformity of rates by classifications for work performed on mechanized units and proper differentials between the various classifications of such labor.

"All explosives, cables, detonators, batteries, fuses and all accessories used in blasting to be furnished by the employers without charge to the mine workers."

Limitation of "the number of supervisory and technical employees exempted in the wage agreement" and provision for



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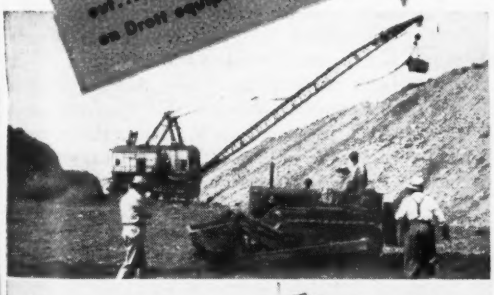

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SMALL PHOTOS: Top—Cleaning-up coal bed. *Center*—Maintaining roads around tipple. *Bottom*—Stockpiling cinders.

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"their proper classification in the wage schedules.

"Employers to furnish union-made tools and explosives.

Agreement by the operators "that it will not be a violation of the wage agreement for the mine workers to cease work to prevent shipment of coal to a consumer whose employees are engaged in a legal strike."

"Reduction in the hours of employment when the present wartime emergency ends. In order to furnish employment for the mine workers now in the armed services and also provide adequate working days per year with essential earnings, the maximum working time for all underground mine workers shall not be more than seven hours per day portal to portal, with a five-day week of 35 hours. Time and one-half and rate and one-half shall be paid for all work performed over seven hours per day and 35 hours per week, with time and one-half and rate and one-half for Saturday and double time for Sunday. Travel time from portal to portal shall be paid for at full work-time rate on the time basis of the report made by the Travel Time Commission appointed by the President of the United States. The working time of all outside employees shall be coordinated with the underground working time."

Russia and Europe Face Coal Problem

Requests for Large Shipments of Mining Equipment for Rehabilitation and Expansion in Europe and Russia Raise Question of Protecting U. S. Requirements

WITH Germany on the ropes, the question of coal for liberated Europe took on a more serious aspect in September. Growing concern over the prospect that requests by foreign countries might, if honored to any substantial extent, seriously limit supplies of modern equipment available to United States operations was expressed in various quarters, along with the suggestion that, since shipping probably would be easier at the end of hostilities on the Continent, the United States should ship coal rather than equipment for mining it. A further twist to the situation was given in a report of the Combined Production and Resources Board, issued Sept. 4, to the effect that military and rehabilitation needs in Europe might require keeping the United States on short coal, paper, textile and shoe rations for a time sufficient to accomplish relief and rehabilitation objectives.

Pointing out that deliveries on some coal-equipment orders have been scheduled as far ahead as the last quarter of 1945 and that "as a broad generalization it is perhaps safe to say that unfilled orders now on the books for coal-mining machinery will take about nine months to complete," the National Coal Association, in its Sept. 9 bulletin, called attention to large requests for equipment from foreign countries and urged a careful study of the situation to determine whether it would not be better to arrange for the United States to ship coal rather than risk hampering its industry by letting large quantities of machinery go to other countries.

"Our country," N.C.A. stated, is being asked to assist in the rehabilitation of mines in India, Africa, to a limited extent in Spain and to a very heavy extent in England, Russia and may possibly be called upon to help out in France and Germany." During the first half of 1944, it stated, some 775 pieces of mining equipment, "including such items as locomotives, shaker conveyors, electric drills, etc., were scheduled to go to foreign countries. It is understood that a great portion of this was shipped. Final figures are not available. The schedule is very heavy for the remainder of the year. The greatest portion of this equipment goes to the United Kingdom, some of it to other British possessions, some to Russia and some to lesser coal-producing countries.

"What of the future? It is reliably estimated that current requests for coal-mining machinery from Russia alone now presented to U. S. manufacturers are so large as to monopolize their entire facilities for upward of two years to the exclusion of all business from their regular customers if this Russian order were given exclusive priority. The present requirements of Soviet Russia for U. S. mining machinery of all kinds for delivery as soon as possible for the reequipment and operation of mines in the postwar period are reported to aggregate upward of 150 million dollars, of which approximately one-half of the dollar value is said to be for coal-mining equipment. These items include large quantities of mine hoists, coal-cutting machines, loading machines, electric drills, pumps, etc."

The N.C.A. comments on the foreign situation were reinforced by other information on rehabilitation and future plans which became available in September. Rehabilitation alone has been a serious problem in certain countries, as in Russia, although reports indicate that destruction was not so complete in others where the Germans have been driven out in a hurry. In a special dispatch to the New York *Times*, dated from Paris Sept. 7, it was stated that "the American advance in the north of France was so rapid that the coal mines around Lens, Bethune, Marle and Courrieres in the region of Lille have been recovered almost intact" and that the Nazis decamped so fast that most of the electrical plants in northern France were left in operating condition, needing only fuel to again start operations. It is understood that this report has been officially confirmed, although no word has been received as to the state of collieries in Belgium. Whether the Germans would wreck properties in the Netherlands before they were driven out was still a question. It also was a question whether they would leave their own properties intact when

Sovfoto

On the first day of work at the Kochegarka mine, in liberated Gorlovka, Donbas, the workers begin clearing the yard.

Sovfoto

In the Moscow basin—Stakhanovite coal miner Gavriil Sazhin, who works in Malevsky pit No. 37, produces 170 to 230 percent of his standard output.

they were driven out of such areas as the Saar and the Ruhr.

A decision to take over the coal mines in the Nord and Pas-de-Calais fields was revealed by the French Government Sept. 27, according to a dispatch to the New York *Times*. This seizure, plus seizure of certain industrial plants, was stated to be a part of a permanent economic reform growing out of the acceptance in France of a trend toward a government-controlled economy in the basic industries of the country.

On the eastern front, the Germans wiped out all of the Russian coal industry they could reach before they were driven out, although some has been rehabilitated, and the assumption was that they would carry out their program of destruction, as far as they were permitted, as they are driven out of such areas as Poland, Hungary, Czechoslovakia and the Balkan countries, thus completing their program of scorching the industry of Europe.

The Russians, however, are reported to have made substantial progress already in rehabilitating the Donbas and Moscow basin coal industries, although they plan a large-scale program of improvement and expansion not only in this area but in other parts of the country. Large new discoveries of coal are reported by Z. Akopdzhanov. "For the prospected natural power resources—coal, oil, peat and hydroelectric—the U.S.S.R. holds first place in the world," declares I. Peshkin. The end of the October revolution, Mr. Peshkin continues, marked the expansion of coal mining in the Donbas as well as the development of the coal industry in the Kuznetsk basin in the Urals, followed by discovery of coal deposits at Karaganda and on the northern slopes of the Urals. The working of the rich brown-coal deposits in the Moscow basin was started. In retreating, the Germans destroyed and flooded all mines in this area and demolished all sur-

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WIRE ROPE is continually fighting a battle-royal with corrosion, friction and wear. Because of the hazards involved, it is neither safe nor economical to use a rope whose original strength has been reduced (by either corrosion or wear) to a point where it no longer affords an adequate factor of safety.

But the safe life span of a wire rope can be greatly extended by keeping it correctly lubricated at all times. The lubricant applied during manufacture will not last indefinitely.

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Important: **An idle wire rope is more vulnerable to corrosion than one in use. So be sure to give your ropes the protection of a good lubricant when they are not in service.**

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SALVAGE PAPER

Everything, as well as everybody, must do its part in the war effort—steel, rubber and, by no means least, paper. As the supply gets scarcer the need for conserving paper becomes more vital. Be as careful in its use as you possibly can, making it stretch as far as possible. When it has served as many uses as it can be put to, salvage it for other war service. Speaking of paper, how about buying another War Bond.

face buildings. "Immense work for the restoration of the mines in the Moscow basin was carried out in one year. At present, their output is already 50 percent in excess of the best months prior to the war."

Rehabilitation in the Donbas was summarized in a special dispatch to the New York *Times* on Sept. 8. A total of "51 large mines have been reopened and 6,000,000 tons of coal, including 2,000,000 tons of coking coal, have been mined, although most of the mines have been flooded and there were not sufficient motors for capacity operation."

Power Plants Destroyed

Reconstruction of the Donbas coal industry is being hampered by the destruction of the power plants in the area, points out A. Khavin in a summary of rehabilitation plans. "The miners, therefore, are sinking smaller mines, which require less time," taking usually two to three months and using largely hand tools with cages also operated by hand. Work also was proceeding on restoration of the large operations involving, among other things, the removal of 41,000,000 cubic meters of water. When completed, "all processes of mining and transportation in the restored mines will be completely mechanized."

As a further step in getting the continent back on its feet coal-wise, twenty Army officers, all with long experience in the coal industry, have gone to the European theater of operations to assist local authorities in investigating conditions of coal mines and distribution systems in liberated and occupied territories so that the demand for coal from the United States and the United Kingdom will be lessened. Twelve of the group have been connected with mining enterprises in this country and eight in the distribution and utilization field. Four of them, Quartermaster officers, lately returned from Alaska, where the Army has been supervising production of coal, to go on the European mission. All 20 took an orientation course conducted by the Solid Fuels Branch, Fuels and Lubricants Division,

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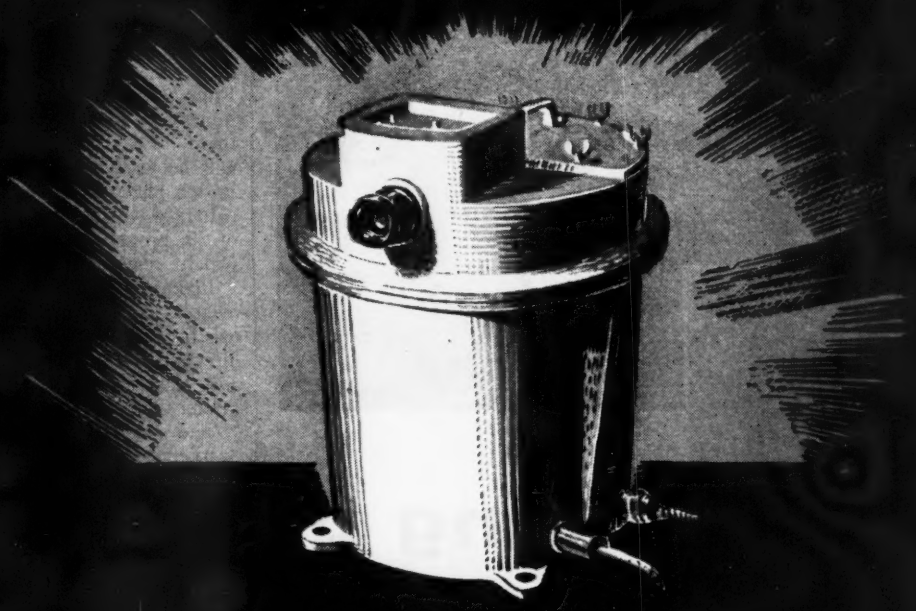

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Office of the Quartermaster General, before leaving.

The group will serve as a coordinating field staff in the European theater. Its mission will include lending technical assistance to national authorities in repair of mines that have been damaged, reassembly of managerial and supervisory forces, recruitment of labor to work the mines, and assistance in making available mine equipment and supplies, either from this country or the United Kingdom. The specific mission of the eight officers in the distribution group will be the coordination of local production with imports for military and civilian use.

Engineer troops will be used in the field in a supervisory capacity, and equipment and supplies will be provided by the Engineer Corps until such time as the mines are able to install civilian equipment. Over-all direction of the program will be vested in the national authorities in whatever countries the mines are located, with the cooperation of the staff of 20, brought together for this task from widely scattered former assignments.

Planning preparatory to setting up the overseas mission and preparation of manuals to guide the group in its activities were directed by the Solid Fuels Branch, Fuels and Lubricants Division of the Quartermaster Corps.

The program is similar to a project that has been under way for some months involving the rehabilitation of the coal mines in Sardinia and reestablishment of distribution mechanism disrupted by the war.

•

Award of Merit Won by Coal Age

Coal Age received an award of merit Sept. 23 for the "Modern Coal Production" number—April, 1944—from *Industrial Marketing* in its seventh annual competition for editorial achievement. The competition was established in 1938 to give recognition to business paper editors for outstanding work in keeping industry and business informed on the most effective practices for efficient operation.

•

Seek Permanent End Of Freight Rate Rise

Petition has been filed with the Interstate Commerce Commission by the National Association of Railroad and Utilities Commissioners, Southeastern Association of Railroad and Utilities Commissioners and various other State railroad and utilities commissions asking that ICC institute a show-cause proceeding on the question of permanent cancellation of freight rate increases authorized by ICC in its decision in Ex Parte No. 148. The increases, which took effect March 18, 1942, and which on coal amounted to 3c. per net ton where the rate was $1 or less and 5c. per ton on rates over $1, have been under suspension since May 15, 1943, the last order deferring them until Dec. 31, 1944. Accepting the petition, the ICC scheduled hearings for Oct. 23, with oral agreement and testimony rather than briefs expected.

The Economic Reconstruction of Europe

THE time is fast approaching when allied and enemy populations alike will demand a blueprint for the economic reconstruction of Europe. The peace plans following this World War will be written piecemeal, and by experts, at a series of continuing conferences, such as Hot Springs, Bretton Woods, Dumbarton Oaks and Quebec, each tracing a new pattern for negotiation and each dealing with a single, specific problem. In the drawing of these plans, the United States, as owner of more than half of the world's industrial capacity, controller of the only great credit reservoir, and possessor of the largest force of highly skilled technicians and management engineers, has heavy responsibilities which its industrial, financial, agricultural and labor leaders cannot evade.

☆ ☆ ☆

Just what is the problem which the world's business leaders must help solve in Europe?

The best safeguard of peace is economic opportunity—a good chance for all peoples to raise their standard of living by their own ingenuity, foresight and industry.

Frustrated and disappointed peoples, who view the future with misgiving rather than hope, breed fanatical demagogues who seek to divert nations from their ills and disappointments by promising military glory and conquests.

Consequently, an important step in building a secure and lasting peace is to open the doors of opportunity to the peoples of Europe.

The greatest obstacle to opportunity in Europe has been economic nationalism.

The economic tradition of the Continent always has been highly nationalistic. The national feeling generated by the first World War, and the political autonomy conferred upon many peoples by the peace treaties, led to a great growth of economic restrictions. This trend was accentuated by the depression and by the military plans of the Fascists and Nazis. Hitler had to show his people they could be fed even if a blockade was imposed again. The inevitable result of these influences was to carry self-sufficiency to tragic extremes.

Economic nationalism holds down the standard of living of Europe in two ways:

1. It prevents the rise in most European countries of low-cost mass production.
2. It operates against an efficient geographical division of labor, preventing nations from doing what each can do best.

Great machines require great markets. One great machine of which the United States has many and Europe few is the continuous strip steel mill. At the outbreak of the war we had twenty-eight such mills of various sizes, England but one, and Continental Europe one. A building containing one of these machines is more than a quarter of a mile long and the minimum cost of the mill is almost $25,000,000. Only the prospect of a mass market justifies production on this vast, but highly economic basis.

The wasteful geographical distribution of production is shown by the agricultural policies of Italy, France and Germany.

In the 1930's, when lard sold for less than 8¢ a lb. in the United States, it cost 32¢ a lb. in Germany. In Italy and Germany imports of wheat were banned and its production at home was heavily subsidized. By the middle of the 1930's, wheat sold for $1.55 a bushel in France, $1.97 in Czechoslovakia, $2.29 in Germany, and $2.47 in Italy. At the same time the United States and the other efficient world producers and exporters (Canada, Australia and Argentina) were *restricting* production and were unable to average more than about 75¢ a bushel for their wheat.

Economic unity in Europe must ultimately mean a freedom to trade not greatly different from what we have within the United States. Given economic unity and the large markets which go with it, efficient mass production will develop. With Europe receiving cheap supplies of such staple foods as wheat, pork, lard and dried fruits from overseas, European farmers can prosper by specializing in producing fresh foods—butter, cheese, eggs, fruits, vegetables.

Then European agriculture will be more prosperous producing its specialties, and our agriculture (and that of the other great efficient surplus-producing countries as well) will have greatly expanded markets for our staples.

With a cheaper food supply for Europe—yet one yielding a better price for our agriculture—European labor will live better. Labor now used uneconomically for agricultural production will be released for industry. With big machines and semi-automatic processes European labor can produce more steel, automobiles, furnaces, plumbing and electrical appliances to advance its standard of living in coming decades, as the United States has done in past decades.

A rising standard of living in Europe will bring

Europeans to view peace with optimism and hope. And world trade grows as confidence and prosperity widen.

☆ ☆ ☆

How would a Europe which possesses economic unity appear to us on this side of the Atlantic?

It would be a prosperous Europe that would have strength in its advancing industries, but as the single great agricultural deficit area of the world, it would be dependent upon overseas supplies for vital agricultural staples. This dependence upon overseas agricultural supplies would be greatest for industrial Germany. Some people believe that a strong Europe would be a threat to world peace. More important, however, is the fact that a strong and prosperous Europe would not be a frustrated Europe. It would have found a way to achieve a rising standard of living. Furthermore, a prosperous Europe would, economically, be a dependent Europe because, although the European industrial worker would use more and cheaper food, he would have it only as long as he maintained the peace.

A prosperous Europe would be of special advantage to American agriculture (if we do not keep on pricing ourselves out of the market) and of great advantage to American industry.

The British policy of buying agricultural staples from abroad, for example, made her, a nation of only 45,000,000, the purchaser, in 1937, of $250,000,000 of all kinds of agricultural products from the United States. In the same year the rest of Europe (exclusive of Russia), with a population of 325,000,000 purchased only $300,000,000 of our agricultural products. But with more sensible organization of its agriculture, Europe could be expected to buy more than one billion dollars of agricultural products from us.

By far the greatest market for an expanded European industry will be Europe itself.

For American industry, there will be growing markets in Europe as industry expands. Experience shows that the trade between different highly industrialized areas is large. This country's biggest export markets have been with its keenest competitors—Britain, Canada, Japan, France and Germany.

Before the war, Europe, with two and one-half times the population of the United States, had only one-sixth as many automobiles.

If Europe (exclusive of Britain and Russia) were to motorize proportionately, it would need 75,000,000 automobiles. With normal depreciation this would ultimately mean 10,000,000 cars to be produced annually to replace worn out cars.

If one still wonders about the immense number of things Europe might produce *for herself*, let him calculate the highway expenditures, the filling and repair station businesses that must be equipped and maintained; and the doubling of the steel production that would be required to make the automobiles themselves and to reinforce with steel even a moderate amount of additional concrete highways.

Another example is the electrification of Europe. With two and one-half times our population Europe's consumption of electrical energy would be 175 million electrical H.P., if the European worker were to have the advantage of as many H.P. as the American. Yet, just prior to the war, Europe's installed operating capacity was only about 40 per cent of this figure.

☆ ☆ ☆

What has been sketched for Europe is actually much more nearly a page from the economic history of the United States than it is mere prophecy about a desirable future for a Europe at peace. But how can it be achieved? And what is our part to be in helping to bring it about?

Economic unity can be provided for the sovereign states of Western Europe by the peace treaty or treaties adopted at the end of the war. The provisions for securing *economic unity* in Europe should specifically cover:

1. Substantial freedom for persons and enterprises to do business anywhere in Europe.
2. Reasonably free movement throughout Europe of persons for employment, recreation and education.
3. Greatly increased freedom of trade:
   a. Within Europe—through the application of a Europe-wide agreement reducing the tariffs among all European countries to a maximum of 10 or 15 per cent.
   b. With the rest of the world—through reduction of European tariffs on goods bought from overseas. This would call for generally lower levels on manufactured goods, and for the removal (after a reasonable period of progressive reduction) of tariffs on all agricultural foodstuffs and most industrial raw materials.
4. A special currency provision requiring as nearly as practicable complete currency stabilization for all countries of Western Europe among each other.
5. Creation of an agency (with adequate revenues) through which all Europe-wide business and other affairs affected by these agreements would be administered for a minimum period of twenty-five years.

This would permit the economic unity of Europe to be substantially achieved. During this period, assistance in administering the provisions would be given by officials of the United Nations.

Near the end of such a period arrangements could be made for a vote in the European countries on whether or not to continue the "unification provisions." If the vote were in the negative, the United Nations would have proper warning that additional safeguards would be necessary to prevent war.

The suggestions made in this statement aim at securing economic unification of Europe and thereby promoting the possibilities of permanent peace in Europe.

The realization of these possibilities throughout the postwar years requires a freely expressed public opinion in Europe to guide all who share the responsibility for bringing peace to Europe and to the world.

James H. McGraw, Jr.

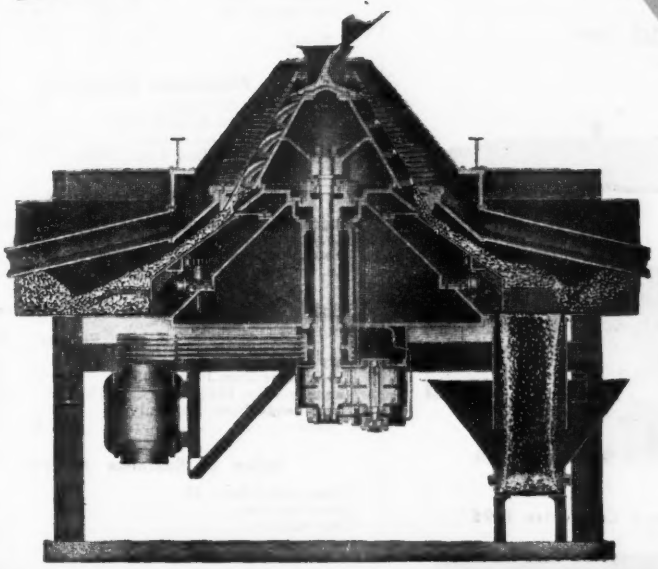
President McGraw-Hill Publishing Company, Inc.

QUICKLY CONDITION *Coal* FOR SHIPMENT OR STORAGE··

"C-M-I" *Continuous Centrifugal* DRYER

★ **Here is the quickest and most economical method for getting greater tonnages of fine sizes in condition. The coal produced with the "C-M-I" Dryer is dried to a non-freezing moisture content. You get more carloads in transit without worry as to freezing troubles when received.**

The dryer may be so arranged that little or none of the finest sizes are lost—or it may be so arranged that the finely divided clay and ash particles are thrown away with the effluent.



Materials, power, and time are conserved. Entire unit takes littel room and is easy to install.

CENTRIFUGAL AND MECHANICAL INDUSTRIES, INC.

SECOND AND PRESIDENT STREETS ST. LOUIS 18, MO.

Developing Mines In Eastern Kentucky

Royce-Kershaw Coal Co., Montgomery, Ala., according to reports, is getting ready to make its first shipments of coal from the Letcher-Harlan border, Kentucky, where it is to develop about 2,000 acres of coal lands carrying three good workable seams. This is to be one of the largest truck mines in the field. Coal is to be trucked to Cumberland, Ky., on the Louisville & Nashville R. R. for shipment. Later, however, it is said, a 7-mile branch of the L. & N. will be constructed to the operation. These interests have been busy stripping a large acreage for several weeks.

An area of thousands of acres of cannel coal lands in the Kings Creek and Line Fork areas in Letcher County, Kentucky, will be opened up soon by Dr. B. F. Wright, Sam Bates and others, of Whitesburg, Ky., it is reported. A federal road project to reach the area has been started, and it is proposed, at first, at least, to develop truck mines altogether.

COAL ACTIVITY

Bituminous Coal Stocks

	Thousands Net Tons Aug. 1 1944	—P.c. Change— From July 1 1944	From Aug. 1 1943
Electric power utilities.	16,965	+3.1	− 9.3
Byproduct coke ovens..	5,736	−6.8	−15.9
Steel and rolling mills..	806	+2.7	−12.2
Railroads (Class I)....	13,793	+3.5	+ 9.7
Other industrials.....	18,253	+4.7	−37.4
Total.....	55,553	+2.4	−18.4

Bituminous Coal Consumption

	Thousands Net Tons July 1944	—P.c. Change— From June 1944	From July 1943
Electric power utilities.	6,416	+4.0	− 1.0
Byproduct coke ovens..	8,007	+2.9	+ 6.9
Steel and rolling mills..	773	−0.6	− 9.5
Railroads (Class I)....	10,253	+0.2	+ 0.5
Other industrials.....	9,847	−4.8	−14.2
Total.....	35,296	.....	− 5.0

Bituminous Production

August, 1944, net tons.....	54,220,000	
P.c. change from August, 1943....		+3.4
Jan.-Aug., 1944, net tons.....	422,435,000	
P.c. change from Jan.-Aug., 1943..		+8.5

Anthracite Production

August, 1944, net tons.....	5,588,000	
P.c. change from August, 1943....		−1.1
January-August, 1944, net tons....	43,706,000	
P.c. change from Jan.-Aug., 1943..		+7.4

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Burners
July, 1944.....	3,259	1,807
P.c. change from July, 1943.	+40.0	+100.6
January-July, 1944.....	15,595	16,401
P.c. change from Jan.-July, 1943.....	+6.6	+66.5

Index of Business Activity*

Week ended Sept. 23.....	231.0
Month earlier.....	2s3.1
Year earlier.....	239.2

**Business Week*, Sept. 30.

Electric Power Output†

Week ended Sept. 23.....	4,377,339,000	
P.c. change from month earlier..		−0.9
P.c. change from year earlier....		+0.4

† Edison Electric Institute.

The customer who drops in at a Thermoid branch office, or visits a Thermoid factory, usually makes two impressive discoveries:

FIRST—*the sincerity of everyone's interest in his call; and*
SECOND—*the number of persons he sees wearing emblems that resemble the ones pictured here.*

Actually, these phenomena are inseparable twins. Both are born of a policy instituted by Thermoid many years ago . . . a policy of company recognitions and rewards that encourage each employee to see himself as an active partner in the one, important business of advancing the common welfare of himself, his employer, his fellow workers and every Thermoid customer. Today, as just one result of that policy, over 300 Thermoid men and women proudly wear service medals representing from 10 years to 50 years of continuous employment with us.

The sense of proprietorship and personal responsibility felt by Thermoid employees is among our most valued assets. It marks a spirit of co-operation that gets things done—and done *right* . . . the spirit that causes Thermoid customers to say: "It's good business to do business with Thermoid."

Thermoid Rubber

DIVISION OF THERMOID COMPANY

TRENTON, NEW JERSEY

DON'T PUT IT OFF 'TIL TOMORROW—
Buy More War Bonds Today!

THE THERMOID LINE INCLUDES: **TRANSMISSION BELTING • F. H. P. AND MULTIPLE V-BELTS AND DRIVES • CONVEYOR BELTING • ELEVATOR BELTING • WRAPPED AND MOLDED HOSE • SHEET PACKINGS • INDUSTRIAL BRAKE LININGS AND FRICTION PRODUCTS • MOLDED HARD RUBBER AND PLASTIC PRODUCTS.**

It's Good Business to Do Business with Thermoid

COMING MEETINGS

- **Illinois Mining Institute: 52d annual meeting, Oct. 27, Abraham Lincoln Hotel, Springfield, Ill.**
- **Coal Division, American Institute of Mining and Metallurgical Engineers, and Fuels Division, American Society of Mechanical Engineers: fall meeting, Oct. 30 and 31, Daniel Boone Hotel, Charleston, W. Va.**
- **Harlan County Coal Operators' Association: annual meeting, Nov. 15, Harlan, Ky.**
- **West Virginia Coal Mining Institute: 37th annual meeting, Nov. 24, Daniel Boone Hotel, Charleston, W. Va.**
- **Sixteenth National Exposition of Power and Mechanical Engineering (Power Show); Nov. 27-Dec. 2, Madison Square Garden, New York City.**

B.C.I. Considers Public Relations

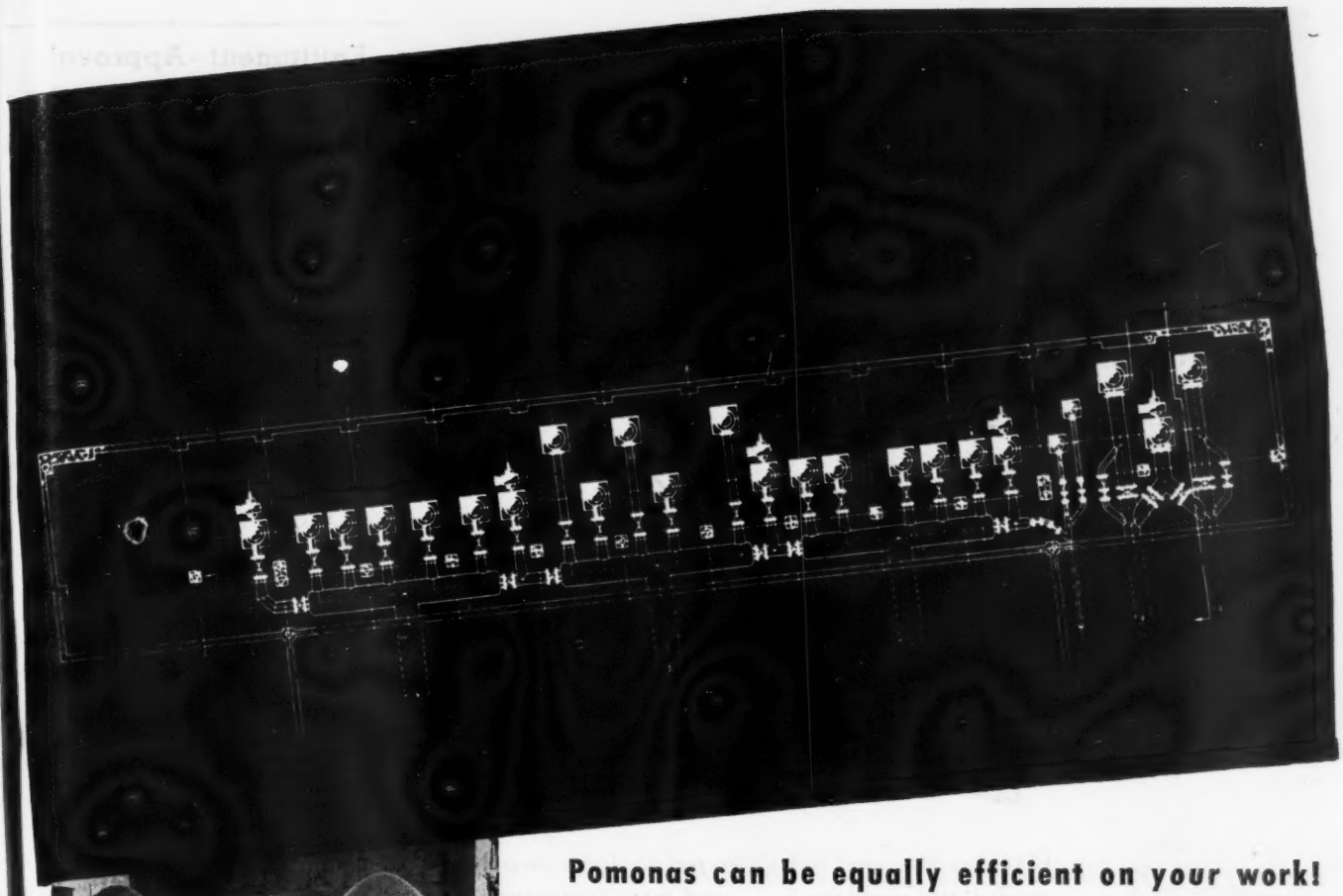
Sales executives of member companies of the Bituminous Coal Institute took part in an invitational forum meeting Sept. 18 at the Hotel Statler, Cleveland, to discuss the entire public relations campaign both for advertising and publicity and to get suggestions for the furtherance and betterment of the program. M. L. Patton, vice president, Truax-Traer Coal Co., was chairman of the meeting. Harry M. Vawter, Bituminous Coal Institute, introduced the various phases of the work being conducted, with explanatory and background descriptive details.

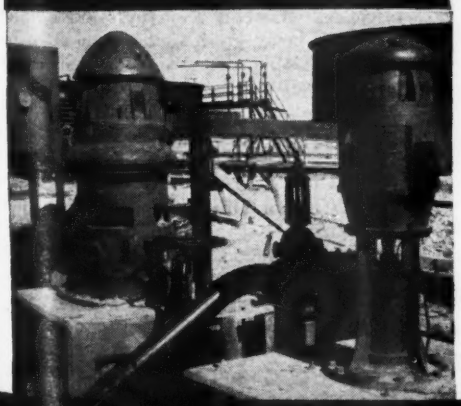
The meeting was opened with a discussion of the public's misconceptions of many sociological as well as utilization aspects of the entire industry, by Maurice Mermey, of Baldwin & Mermey, public relations counsel retained by the institute. The problems and the extensive results of the publicity and information service mentioned by the institute, together with the educational programs extended to editors, reporters, writers, commentators and speakers, was outlined by Spencer Armstrong, assistant to Mr. Vawter, in charge of the information service.

Five-foot blow-ups of forthcoming advertisements, in full colors, were shown to the sales executives, as also were black and white reproductions. A 25-ft.-long scroll of newspaper and magazine publicity clippings was displayed, as also were some 300 publicity photographs of human interest stories recently taken in the coal fields.

After a general review of the institute's objectives in raising the stature of the bituminous coal industry in the public mind, Clarence Goshorn, president, Benton & Bowles advertising agency, explained in detail the advertising approach to the public to gain the greatest interest of the largest segment of the people in appreciating the importance of coal to them, even though they might not be users personally.

Details of the institute's present contest among architects for "flexible heating," to stimulate the specifying of chimneys of ample size to accommodate use of all fuels,





Pomonas can be equally efficient on your work!

WHETHER *your* operations are large or small, there are valuable pointers in this Cities Service installation to help you. For example, the unusual compactness of Pomona Pumps meant important savings on foundations, pump house, construction costs, etc., as well as a simpler, more compact piping arrangement that will continue to pay dividends in lower costs, easier maintenance for years.

Savings like that are important on *any* installation. Then look at the versatility of Pomonas both as to application and type of drive . . .

- The pumps for general water service consist of fifteen electrically driven vertical pumps manifolded into three groups of five pumps each. The standbys are four Pomona Verticals, each driven by a 450 hp *steam turbine* through a right angle gear head drive.
- Three more Pomona Pumps of a different type—Niagara Mixflows—take care of the condenser water service. Two are electric drive and the third—a standby—is horizontal steam turbine drive, assuring positive power in any emergency. Each of these pumps is rated 20,000 gpm at 43' head and a unique by-pass arrangement in the piping opens automatically to protect motors against overload should pressures become excessive.
- Water for fire service is supplied by two additional Pomona Verticals, both turbine driven and each delivering 1000 gpm at 150 lbs. pressure.

In addition, at another pumping station six more Pomona vertical turbine pumps, each rated 9000 gpm at 150' head, handle the cooling tower pumping at the Butadiene Plant, while another electric-drive Pomona handles fire protection pumping at this plant.

This is another typical example of the ability of Pomona equipment to handle all types of pumping jobs in plant operations, large or small. Why not let our trained engineering staff consult with you on the best solution to YOUR particular problem? See your nearby Pomona dealer . . . or write!

Send for Bulletin No. C-10

POMONA PUMP COMPANY

POMONA, CALIFORNIA • 2850 CHIPPEWA ST., ST. LOUIS 18, MISSOURI

Pomona Products DEEP WELL PUMPS NIAGARA PUMPS MINE PUMPS LITTLE CHIEF PUMPS

Equipment Approvals

Two approvals of permissible equipment were issued by the U. S. Bureau of Mines in August, as follows:

William M. Lennan, Inc.—Rub-R-Lite flashlight: Approval 610: Aug. 3.

Goodman Manufacturing Co.—Type E-11 shaker conveyor: 10-hp. motor, 440 volts, a.c.: Approval 516A: Aug. 7.

including bituminous coal, together with blown-up specimens of advertising to be run in magazines of special interest to home owners, was explained by Harold F. Douglas, vice president, Benton & Bowles.

A special new trade-magazine advertising campaign designed to give aid to retail coal dealers, with a coupon offering them a booklet of such information, was discussed by Neal Nyland, account executive, Benton & Bowles. Discussions of each phase of the public relations program followed the various presentations, and numerous suggestions were given by the coal sales executives, many of which, it was stated, will be adapted and incorporated into the future program of the institute for better public and customer relations.

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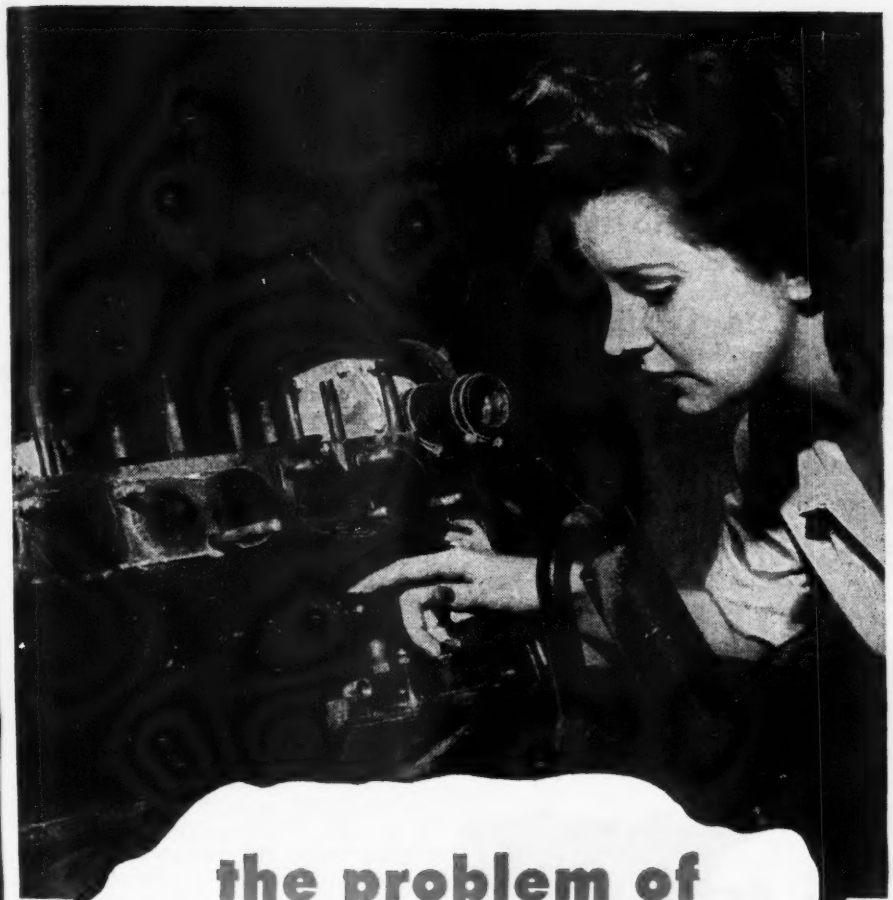
To Seek Plant Sites For Synthetic Fuel

Engineering survey parties will be sent into the field soon by the U. S. Bureau of Mines to examine potential locations for synthetic liquid fuel laboratories and demonstration plants, Secretary of the Interior Ickes announced Sept. 17. Authorized by the Synthetic Liquid Fuels Act, these laboratories and plants will conduct a five-year program of research and development to prove the "know how" for private commercial production of oil and gasoline and other petroleum-like products from the nation's reserves of coal, lignite, oil shales and agricultural and forestry products.

More than 150 site proposals have been submitted to the Bureau, Mr. Ickes disclosed. Careful and thorough consideration is being given to the qualifications of each of the suggested sites, which represent nearly all the coal-producing states, he stated.

As a further development in September, Secretary Ickes announced that an oil shale research and development laboratory is to be established by the U. S. Bureau of Mines at the University of Wyoming, Laramie. As part of the synthetic fuels program recently authorized by Congress to determine the best methods of converting the large deposits of oil shale in the United States into a lasting supply of oil and gasoline for the postwar years, the laboratory will conduct research on the composition of oil shale, shale oil and their products, and study improved methods of processing and using these materials, Mr. Ickes declared.

The laboratory, which will be an adjunct of the Bureau's present petroleum experiment station at the university, also will handle problems arising in the operation of an oil-shale demonstration plant that



the problem of SLUDGE

IT IS well known among automotive engineers that engine deposits (sludge) cause stoppage of oil circulation, sticky rings, oil pump trouble and other serious damage resulting in overhaul time and expense.

Sludge either stays in suspension in the oil and causes the lubricant to become black, or it sticks to the motor parts and does its dirty work of destruction.

LOW AND HIGH TEMPERATURE SLUDGE

There are two general types of sludge — that caused by low temperature operations and that by high.

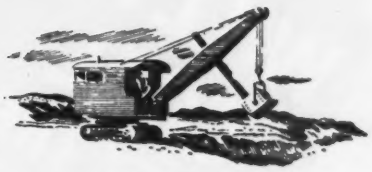
Low temperature sludge is usually a semi-solid material with the consistency of soft mud. It is composed of oil mixed with water and fine particles of carbon, metal, dirt, dust or fuel gums.

"Stop and Go" operation with prolonged idling of the motor is a common cause of low temperature sludge. A leak in the water system surrounding the cylinders may also be responsible. Low temperature sludge clogs the oil lines and screens, resulting in burned out bearings and scuffed cylinder walls.

The principal difference between high temperature sludge and low is that the former contains large amounts of resins resulting from the oxidation of the oil in the crankcase. This type of sludge is comparatively free from water and soot.

High temperature sludge produces two different kinds of deposits in the engine. The granular or "coffee ground" sludge in the crankcase or oil pan and on the surface of the pump screen is well-known to mechanics. Varnish, gummy or lacquer-like deposits that form on piston and ring faces and cylinder walls, because of high temperature oxidation of thin oil films, is another kind.

High temperature sludge is caused from prolonged high speed and engine operation, overloading the engine, clogged radiator or cooling system.



HOW TO REMEDY SLUDGE SITUATION

Low temperature sludge can be easily recognized by simply heating some of the deposit on a piece of metal over a flame. If the material foams or sputters and crackles, then water is present. To remedy this, check for internal water leaks and raise the temperature of the cooling water to 160° to 180° and keep it there by means of radiator shutters or thermostats.

To remedy high temperature sludge, inspect radiators and water jackets and see that they are clean and free of mud and scale. Drain and flush crankcase frequently, especially in heavy duty service. Oxidation of the crankcase oil can be minimized by the use of oil coolers in heavy duty truck service. Keep the crankcase oil temperature below 200° F.

To prevent either type of sludge, keep the lubricating oil clean. Filtering is not enough. Frequent draining and flushing of the crankcase is essential. Drain oil while hot. Base drain periods on a type-of-use basis, rather than time or mileage interval. Keep both air and oil filters free from dust and other foreign matter.

MACMILLAN RING-FREE OIL HELPS REDUCE SLUDGE — *One of your most effective sludge remedies is a good lubricating oil. Macmillan Ring-Free Motor Oil (for either Diesel or gasoline fuels) is so refined that it removes the carbon and sludge from the working parts of the engine. It cleanses as it lubricates. The deposits are kept in the oil in suspension and are drained off when you change oil. That's why Ring-Free is black when it's drained.*

You'll be surer of fewer motor troubles with Ring-Free Oil.

Free Folder on Sludge — Its Causes and Cures

Write today for your copy • Address: Macmillan Petroleum Corp., 530 W. Sixth Street, Los Angeles 14, Calif.

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN PETROLEUM CORPORATION — 50 WEST 50TH STREET, NEW YORK 20 • 624 SOUTH MICHIGAN AVENUE, CHICAGO 5 • 530 WEST SIXTH STREET, LOS ANGELES 14 • COPYRIGHT 1944, MACMILLAN PETROLEUM CORPORATION

the Bureau proposes to construct in the West. A site for the demonstration plant is now being sought in the Green River formation of Colorado, Utah and Wyoming. An engineering crew recently was dispatched by the Bureau to the Rifle-Debeque area of Garfield County, Colorado, to begin initial surveys.

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Bright Future Seen For Home Heating

Bright postwar prospects for the sale of domestic heating and air-conditioning equipment, tempered by the realization of the necessity for breaking down customer resistance, was the theme of the first annual open forum of the Indoor Climate Institute held at the Hotel Book Cadillac, Detroit, Sept. 21 and 22.

Ralph C. Cameron, director of merchandising, Airtemp Division, Chrysler Corp., predicted a market of 1,400,000 domestic heating units and 86,000 air-conditioning units of all types in the first year after the war. In five years, Mr. Cameron said, such sales would have a dollar value of $346,000,000 for heating units and $84,000,000 for air-conditioning units.

Prior to the war, said Mr. Cameron it cost $1,500 to install a combination heating and air-conditioning unit with forced warm air in the average new home and $750 to install air conditioning alone if the heating units and ducts already existed in an old house. He predicted both costs would decrease with quantity production.

The allocation of money for heating equipment in the average home has been cut 50 percent in recent years, said J. K. Knighton, sales manager, air-conditioning division, Servel, Inc., without a corresponding increase in the quality of performance. The public concept of heating, he declared, placed it in the class of a necessity with little or no understanding of quality. The institute's biggest problem, in his view, was to create a public desire for quality heating.

Raymond M. Foley, Michigan State Director, Federal Housing Administration, decried what he termed "overselling" of the equipment the average home owner will be able to afford in the postwar house. He warned the institute not to neglect modernization of heating in old homes, which he said was a much vaster market than new construction.

The average postwar home will cost about $6,000 and the owner will demand fully automatic heating equipment, Mrs. Henry Mollgaard, co-chairman, postwar planning committee, National Association of Home Builders, said. The better quality houses, she predicted, also will demand fully automatic climate control.

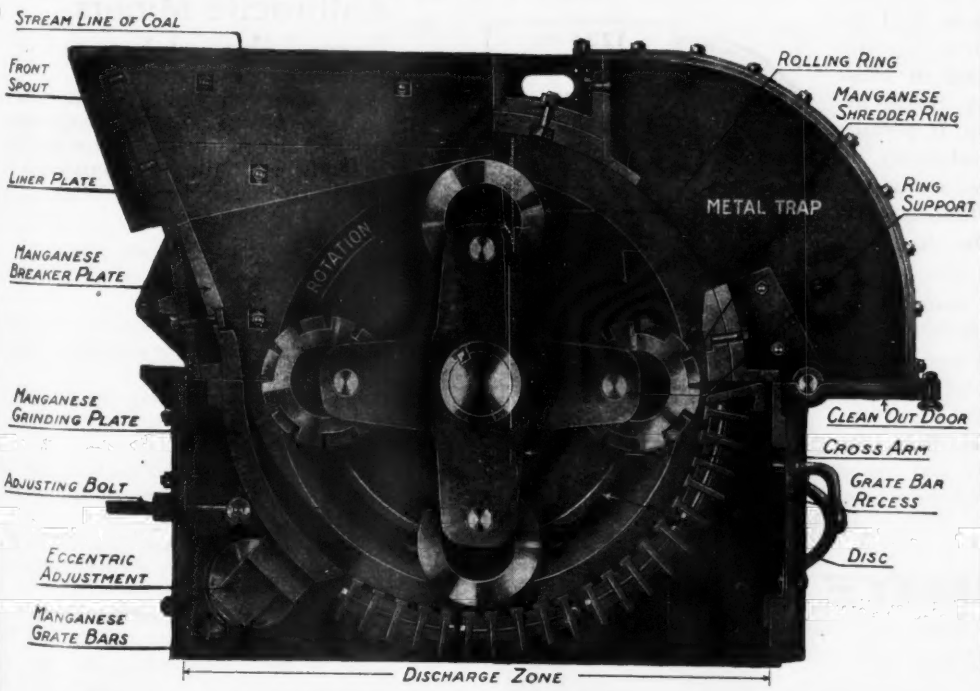
At an editors' panel conducted by C. D. Lyford, Minneapolis-Honeywell Co., chairman of the public information committee, and E. R. Grace, institute public relations director, a program for conveying information on climate control to the public through the columns of business and general magazines was discussed. A survey, with all magazines directing questions to their specific reader groups, was outlined

Dependable ACTION OF CRUSHING PARTS ...SPEEDS UP THE WORK

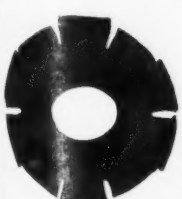
GREATER RANGE OF REDUCTION—UNIFORMITY OF SIZE
CRUSHING AT LESS THAN ONE CENT A TON
EXTREME SIMPLICITY OF OPERATION

AMERICAN *Type "S"* ROLLING RING CRUSHER

To install an American Rolling Ring Crusher now equips you with facilities for immediately reducing your crushing costs to less than one cent a ton including all costs. In making possible this low per-ton cost as the coal is split from bituminous lump coal to uniform stoker or pulverizer sizes, you increase tonnage. Simplicity of construction and operation—accessibility at all times and real flexibility on the job all point to economy for you. External adjustment—compact design. Each unit arranged to meet the particular requirements of each installation.



You can get an American Rolling Ring Crusher in the correct type and size for your requirements. Regardless of the type we find practical for your purposes, you are assured of large daily tonnages of coal properly sized at extremely low cost. Let us survey your requirements and make recommendations.


(PATENTED)

Coal is split instead of crushed—Reversible Manganese Steel Shredder Rings reduce fines to a minimum

This splitting action of the SHREDDER RINGS shatters and distributes the coal before it reaches the Breaker and Grinding Plates. These patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher. They have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at the specified speeds. In contact with solid metal the rings are momentarily deflected from their usual course because they are free to swing back out of position. There are no shear pins or other safety devices that require attention.

Metal Trap or Tramp Iron Catcher

The fact that the rings are thrown back when they encounter non-crushable material protects the crusher from damage by foreign materials. This flexibility or "give" makes the crusher self-acting against tramp material. In order to trap this material, the "S" type of American Ring Crusher can be equipped with a metal trap or tramp iron catcher. This device catches tramp iron, wire, and other non-crushable materials. The Grinding Plate is adjustable—a feature that lengthens its life. It is adjustable by means of an eccentric movement and can be adjusted while the crusher is in operation. This feature makes it possible to vary the size of the finished product.

AMERICAN PULVERIZER COMPANY 1119 MACKLIND AVENUE ST. LOUIS, 10, MISSOURI

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

to determine the postwar desires and plans of home builders.

Arthur H. Motley, publisher, American Magazine, and William B. Stout, director of research, Consolidated Vultee Aircraft Corp., spoke at luncheon and dinner respectively. Mr. Motley's topic was "Production Won the War, Selling Will Win the Peace." Mr. Stout spoke on the advantages of research for a new industry, and said no one had yet been able to envision the vast future of climate control. He predicted yearly models in homes after the war, much like yearly models in automobiles.

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Accelerated Demand Spurs Dewatering

Acceleration in demand for anthracite has resulted in dewatering operations being started in several mines allowed to become drowned out years ago because of waning coal demand or high mining costs. Pumping installations are now being made as follows: dewatering 9th level, Buck Mountain, Hazleton Shaft, Lehigh Valley Coal Co., by means of a 2,000-g.p.m. pump; draining Buck Mountain and Lykens basins, Spring Mountain colliery, Payne Coal Co., requiring a 2,500-g.p.m. pump.

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Anthracite Miners Urge Liberal Laws

Resolutions concerning liberalization of the social security laws and compensation payments unanimously adopted at the 14th convention of District 9 (Pennsylvania anthracite), United Mine Workers of America, were as follows:

1. A law compelling coal companies to pay compensation for miners' asthma caused by coal mining.
2. Partial disability payments for 400 weeks compared with the existing period of 200 weeks.
3. Compensation during the first week of idleness if it lasts for four weeks or longer.
4. Hospitalization and medical care for injured miners for 90 weeks instead of the current 60 weeks.
5. Permanent company help for miners permanently and totally disabled in mine accidents.
6. Payments to dependents of miners killed in mine accidents until they are 18 years of age. Payments now cease at 16 years.
7. Increased unemployment compensation from "a minimum of $12 weekly to a maximum of $25."
8. Payment of unemployment compensation for 25 weeks. It is now paid for 14 weeks.
9. Old-age social security payments beginning at 60 instead of 65.
10. Minimum social security payments of $60 monthly.

The convention also proposed that John L. Lewis, U.M.W. president, be selected to represent labor at the coming peace conference.

Personal Notes

L. C. ILSLEY, internationally known electrical engineer whose pioneer work in testing and developing safer electrical equipment for use in coal mines has saved many lives in the United States and other countries, retired from the Bureau of Mines Sept. 30. Joining the Bureau in 1910, only a few months after the agency was created, he immediately became associated with electrical research work in coal mines, then a new field of study because few of the nation's coal mines used electricity in underground operations. In 1919 he became chief of the Bureau's electrical section at the Central Experiment Station, Pittsburgh, Pa., a position he held continuously until his retirement.

L. E. YOUNG, consulting engineer, Pittsburgh, Pa., former vice president of the Pittsburgh Coal Co., has gone to England to do a special consulting job for the U. S. Government regarding lend-lease. He is acting in a consulting capacity on the rehabilitation of coal mines in France, working with the Foreign Economic Administration.

S. F. GRONE, superintendent of Staunton No. 7 mine of the Consolidated Coal Co., Staunton, Ill., has resigned to resume his former work as head of the engineering department. He has been succeeded by DAVID NEAL, superintendent of Mt. Olive No. 15 mine, Mt. Olive, Ill., who will act in the same capacity at both mines. EMIL HALLER will be manager of No. 7 mine, where he succeeds JOHN L. SHAMBLIN, who has become superintendent of Jefferson No. 20 mine, Nason, Ill.

G. R. SPINDLER, assistant director, School of Mines, West Virginia University, is to give lectures on mine mechanization at Sheffield University, Sheffield, England, where he has arrived.

G. D. AKERS has been named as mine foreman by the Letcher County Coal Co., Fleming, Ky., vice George Fuller, deceased.

WILLIAM WRIGHT, former track man and timberman, has become a mine foreman at No. 207 mine of the Consolidation Coal Co., Dunham, Ky.

A. A. JENKINS has been elected vice president of the Hanna Coal Co. and the Jefferson Coal Co. He will continue to serve as general sales manager of the Ohio coal department of the M. A. Hanna Co.

JAMES THORPE, superintendent of Sunnyside mine of the Utah Fuel Co., Sunnyside, Utah, has been transferred to Castle Gate mine as superintendent, vice WALTER WETZEL. Mr. Thorpe has been with the company since 1911.

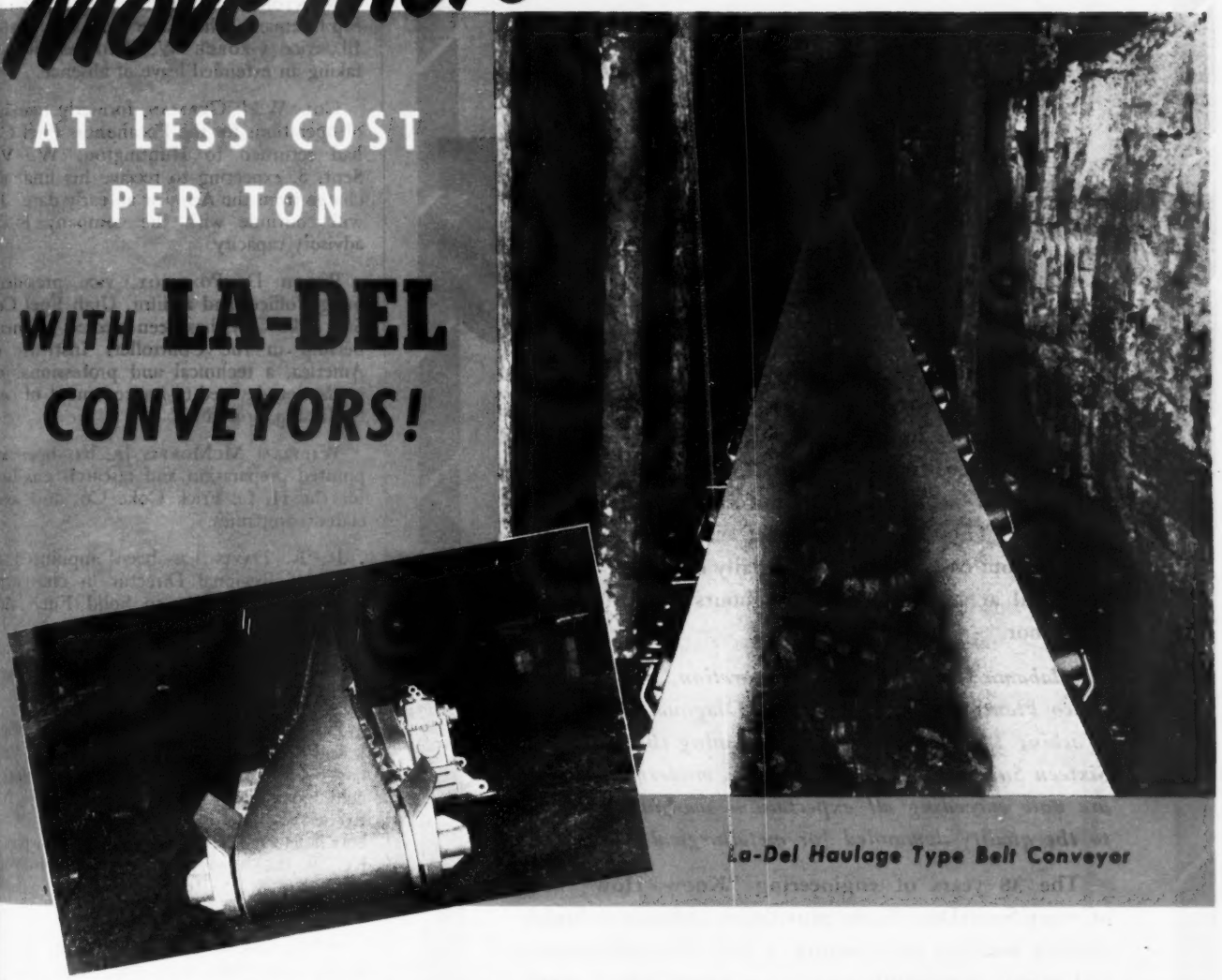
CARL S. WESTERBERG, preparation superintendent for the Utah Fuel Co. washeries, has been selected as project manager over operations at the company's Sunnyside (Utah) mine.

JOSEPH BRUBAKER has been advanced from assistant engineer to engineer by the Utah Fuel Co., operating in Carbon

Move More Coal

AT LESS COST PER TON

WITH LA-DEL CONVEYORS!



La-Del Haulage Type Belt Conveyor

If you're looking for a coal conveying system that will *move more coal* at less operating (power and maintenance) expense—*look to La-Del Belt Conveyors!* For most major mine operators have found the real answer to economical movement of their coal with La-Del Belt Conveyors (names on request).

THERE'S A REASON

Design and engineering are responsible for the popularity of La-Del Room, Gathering and Haulage type Belt Conveyors. La-Del Engineers—expert mining men, trained to recognize and solve the conveying problems of mine operators—work constantly toward the goal of *more production at less cost.*

PERFORMANCE FEATURES

Exclusive, sealed-for-life precision ball bearings on all belt idlers reduce power consumption and maintenance costs. Design improvements assure positive alignment for all conveyor lengths whether operated forward or reverse. Mechanical improvements eliminate spillage, increase belt life and reduce operating costs.

For complete information on La-Del Belt Conveyors or other La-Del Mining equipment, write today! La-Del Engineers are always at your service.

BUY MORE WAR BONDS

And Keep the Bonds You Buy!

LA-DEL'S OTHER MINING EQUIPMENT

Underground Chain Conveyors • Shaker Conveyors • Elevating Heads • Pit Car Loaders • Mobile Loading Machines • La-Del Troller Mine Ventilating Fans and Blowers • *Remember*, La-Del Service Includes Experienced Council Before and After Installation!

MATERIAL HANDLING LA-DEL MINE VENTILATION

LA-DEL CONVEYOR AND MANUFACTURING CO.

New Philadelphia, Ohio

COMPLETE LINE OF UNDERGROUND CONVEYORS FOR LOW COST OPERATION

County, Utah. BERT CLERICO has been promoted to assistant engineer.

R. T. WHITTAKER has been appointed as superintendent of the Utah Fuel Co.'s Somerset mine, Somerset, Colo.

WINTON WRIGHT has been appointed top foreman at the Valier Coal Co., Valier, Ill., vice GEORGE W. THOMAS, who is taking an extended leave of absence.

COL. W. J. GERMAN, formerly manager of operations for the Pocahontas Fuel Co., had returned to Huntington, W. Va., Sept. 8, expecting to receive his final discharge from the Army at an early date. He will continue with the company in an advisory capacity.

RALPH D. POMEROY, vice president, budget officer and auditor, Utah Fuel Co., Salt Lake City, has been elected to membership in the Controllers Institute of America, a technical and professional organization devoted to improvement of controllership procedure.

WILLIAM MCMORRIS JR. has been appointed preparation and research engineer for the H. C. Frick Coke Co. and associated companies.

R. R. DAVIS has been appointed as Assistant Regional Director in charge of anthracite, according to Solid Fuels Administrator Ickes. Mr. Davis succeeds E. L. WILSON, who resigned to resume his former position with the Lehigh Navigation Coal Co.

DR. HUSTON ST. CLAIR, president, Jewell Ridge Coal Corp., Tazewell, Va., has been made president of the Clinchfield Coal Corp., Dante, Va., vice V. N. ROADSTRUM, who succeeded the late Gilbert E. Reese. A. R. MATTHEWS, Closplint, Ky., is the newly elected executive vice president. J. P. ROUTH has been named chairman of the board.

H. A. GLOVER, vice president, Island Creek Coal Sales Co., has been elected vice president of the Island Creek Coal Co.

C. R. BOURLAND, formerly general manager, Lillybrook Coal Co., Lillybrook, W. Va., has been appointed assistant to the the New River Co., Mt. Hope, W. Va.

O. B. CLARK, formerly superintendent, Boone County Coal Corp., Sharples, W. Va., has been named general manager, Lillybrook Coal Co., Lillybrook, W. Va.

E. A. BERRY, of the Koppers Co., Pittsburgh, has been elected a vice president of the Controllers Institute of America.

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Preparation Facilities

DANCOTT COAL CO., INC., Shamokin, Pa.—Contract closed with Wilmot Engineering Co. for one Type A Wilmot Simplex jig to prepare pea and No. 1 buckwheat coal; feed capacity, 15 t.p.h.

SIMS COAL CO., Frackville, Pa.—Contract closed with Wilmot Engineering Co.

for one Type A Wilmot Simplex jig to prepare pea coal; feed capacity, 15 tons per hour.

ALDEN COAL CO., Alden Station, Pa.—Contract closed with Deister Concentrator Co. for two SuperDuty diagonal-deck No. 7 washing tables, one to handle No. 4 buckwheat and one to handle No. 5 buckwheat anthracite.

SOUTH TAMAQUA COAL POCKETS, Tamaqua, Pa.—Contract closed with Deister Concentrator Co. for two SuperDuty diagonal-deck No. 7 washing tables, one to handle pea and one to handle rice anthracite.

FAIRVIEW COLLIERIES CORP., Fairview, Ill.—Contract closed with McNally-Pittsburg Mfg. Corp. for 50-t.p.h. McNally-Rheo fine-coal plant to clean and recover ½-mm. x 0 sludge; recovered sludge to be dried in McNally-Carpenter centrifugal dryer.

•

Delaware Pollution To Be Studied

Representative E. H. Wene (N. J.) has placed in the hands of the House Committee on Rivers and Harbors for action a resolution providing for a preliminary examination of the pollution situation in the Delaware River and its tributaries. The examination is to seek methods whereby contamination of the Delaware Watershed will be eliminated.

•

Brattice Cloth Needs

Discussion of current inventories and procurement requirements of brattice cloth to be shipped from primary markets during the first half of 1945 at a meeting of the Brattice Cloth Advisory Committee, the War Production Board reported Sept. 22, showed that industry figures indicate inventories of jute and cotton brattice cloth as of July 31, 1944, both spot and afloat, amounting to about 4,000,000 sq. yd. In addition there was on order, including recently authorized purchases, a total of about 6,600,000 sq.yd., or a total visible supply of 10,600,000 sq.yd. Provided there are no serious delays in shipment, this should take care of industry's needs through February, 1945, and allow a working inventory of about 3,000,000 sq.yd. or a three-month supply, industry members said.

WPB said it would consider arranging a further importation of 6,000,000 sq.yd. to meet requirements through August, 1945, and allow for a three-month inventory. An announcement is to be made as soon as possible setting the time for filing applications for import authorizations and the basis on which applications will be granted, officials said. WPB will explore the possibility of obtaining the construction of cloth preferred.

The committee was advised that importers may soon be permitted to negotiate and purchase direct from their regular suppliers in Calcutta. Purchases from the Calcutta market have been made through the Foreign Economic Administration.

Make Your Motors Like New!

REPLACE OLD-TIME SLEEVE BEARINGS WITH KEYSTONE BALL BEARING END BELLS!

SLEEVE BEARINGS don't cause all motor trouble—but they're accountable for too large a percentage of it. Well do you know that sleeve bearings wear and cause interference of rotor and stator on AC motors . . . and that oil, used to lubricate sleeve bearings is carried as a vapor in the ventilating air stream, causing coil failures or commutator burnouts.

Forestall these troubles . . . at low cost. Install Keystone Ball Bearing END BELLS and make your old motors perform as though they were new!

In your shop crowded with motors, check them over to find how many are on sleeve bearings. The proportion may surprise you. And you will discover how many "just-like-new" motors you will have by installing Keystone Ball Bearing End Bells on them.

Write for full information. Send us nameplate data from one of your motors which you are repairing now. We will send you quotations.

SOLD BY: *Ohio Ball Bearing Company, 655 Market Street, Youngstown 1, Ohio • Ohio Ball Bearing Company, 330 E. Eighth Street, Cincinnati, Ohio • West Virginia Bearings, Inc., 8 E. Virginia Street, Charleston, West Virginia • Indiana Bearings, Inc., 643 Ohio Street, Terre Haute, Indiana • Bearing Service Company, 9 N. W. First Street, Evansville 1, Indiana • Berry Bearing Company, 2633 S. Michigan Avenue, Chicago, Illinois R-J Bearings Corporation, 3152 Locust (at Compton), St. Louis, Missouri • Associated Bearings Company, 207 E. Twenty-second Street, Kansas City, Missouri • Colorado Industrial Supply Company, 1620 Wazee Street, Denver 17, Colorado • Bearing Service & Supply Company, 68 W. Fourth Street, Salt Lake City, Utah.*

Miners Face Trial For Inciting Strike

Three members of Packer No. 4 collier committee, East Bear Ridge Colliery Co. near Girardville, Pa., are to be tried in the U. S. District Court in Philadelphia for alleged violations of the Smith-Connally Anti-Strike Act. They are accused of exhorting fellow workers to remain away from their jobs in protest against the refusal of the mine operator to accede to their demands. The action of the men is alleged to have resulted in a five-day shutdown while the mine was under government supervision.

•

Electrical Group Studies Mine Power

The 1944-45 season of the Mining Electrical Group of Southern Illinois opened Sept. 7 at the West Frankfort Country Club with Joe Bailey, General Electric Co., Schenectady, N. Y., putting on a combined talk and inspection trip covering a d.c. unit substation with sealed-ignitron mercury arc rectifiers in normal coal-mining service. The program comprised: (1) a talk that included the history of development and the types of mercury-arc rectifiers and a description of the new 300-kw. unit at Old Ben Coal Corp. Mine 15; (2) an inspection trip to see the set in operation and observe certain features of the station.

Mr. Bailey briefly described the pump type and the sealed-ignitron-tube rectifier, pointing out that the ignitron type starts immediately on the application of power while the pump type may take a considerable time to attain a working vacuum.

The substation at Old Ben Mine 15, which is of the ignitron type and is installed in a building on the surface, was described in detail. The term "unit substation" is applied to electrical power equipment installed in a single cubicle or, as in this case, a series of cubicles bolted together to form an integral unit. It includes the power-transforming devices, indicating instruments and necessary controls. This particular substation consists of two cubicles at the left, then the pyranol transformer, followed by three cubicles at the right. Among the various protective devices are a 3-shot relay on the incoming power circuit breaker, which automatically permits three attempts to restart in case of power failure, before looking out; warning of tube failure or, if preferred, shutting down the unit; misfire relay.

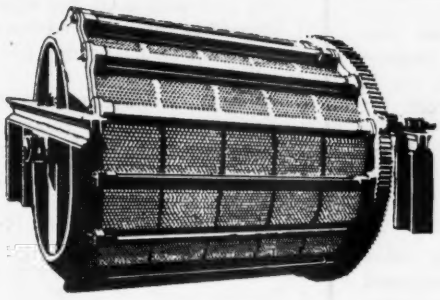
Mr. Bailey gave the following answers to problems of operating rectifiers:

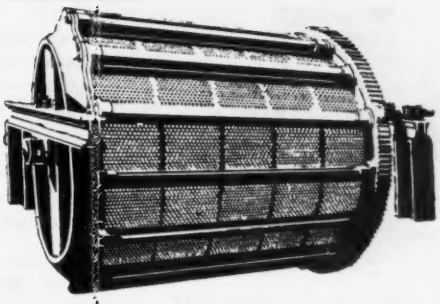
The unit (six tubes) will operate on five tubes, or even four, in an emergency. The capacity with five tubes is 62 percent of rating.

A tube can be changed in 15 or 20 minutes.

Tubes carry a warranty of two years' shelf life, followed by three years of operation.

The natural voltage characteristic of a rectifier is a straight line with 7 percent droop to full load. Rectifiers cannot be overcompounded. They can be undercompounded or flat compounded up to





Machine-Loaded R.O.M.

- When ROM is machine-loaded in the Mine, rock, bony and sulphur balls are unavoidably included.
- In preparation for market shipment, or washing, this foreign material must be removed.
- A simple rugged "Pennsylvania" Bradford Breaker will automatically remove, from the R.O.M., this hard rock and sulphur balls, which will often wreck a conventional Coal Crusher.
- The reduction is made to 2", 4", 6" or 8" and down, as required by the Washing Plant or for shipment.
- Write us your problem. We can reduce your labor and also your operating cost.

Specialist in Patented REVERSIBLE Hammermills, Bradford Breakers, BRADFORD-HAMMERMILLS, BRADMILLS, Single Roll Crushers, IMPACTORS, Log Washers

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Offices throughout the world
"Vanner" London

full load with a voltage regulator; that the voltage can be pulled down to a flat li up to full load. Beyond full load, volta will droop.

The d.c. voltage may be controlled ov a considerable range (about 15 percent This control is used to maintain consta d.c. voltage with a voltage regulator up full load.

Overload guarantees are the same as f a motor generator.

Connected by a trolley or feeders, at distance apart of 2,000 or 3,000 ft., rectifier will operate in parallel with rotary converter or motor generator witho voltage regulation of the latter. If t distance drops to 500 ft., Mr. Bailey su gested trial, with final arrangements go erned by the results. Two rectifiers w parallel in the same room. With a mot generator in the same room, a voltage reg lator might have to be used on th rotating machine.

Pyranol transformers, such as are use with rectifiers, are recommended for use buildings and in coal mines. Gener Electric never has had a fire caused by rectifier.

Any telephone interference may no mally be reduced by keeping telepho lines as far as possible from the trolle transposing telephone wires at 10- or 12 intervals, or using a twisted pair.

•

Memphis Natural Gas Rehearing Under Way

Rehearing of the previously decide Memphis natural-gas case got under wa Sept. 7 before the Federal Power Com mission. The Memphis Natural Gas C seeks authority to bring a large quanti of additional natural gas into the Memphi area. The Commission dismissed th original application on the ground th natural gas should be restricted and no used indiscriminately for such purposes boiler fuel, as there is a relatively limite supply as compared with coal.

Actively opposing the Memphis com pany and its supporters are the Nation Coal Association, United Mine Worke of America, railway labor and the Stat of Louisiana, Texas, Mississippi, Kans and Arkansas.

•

Obituary

ALBERT F. SHORT, 50, vice president both the International Coal & Coke C and the McGillivray Creek Coal & Co Co., Coleman, Alta., died early in Septe ber at Coleman. First entering the empl of the McGillivray Creek company in 191 after going to Canada from London, En land, he was appointed secretary of th company in 1916. When the joint ma agement of the McGillivray Creek and I ternational companies was effected in 193 he was appointed secretary, and in 194 he was made vice president.

GEORGE FULLER, 55, mine foreman f the Letcher County Coal Co., Flemin Ky., died Sept. 18 in the Fleming Hospit four hours after being crushed by a sla fall in one of the mines of the compan

How to LOWER YOUR COSTS to assure future profits!

Nolan Rotary Car Dumpers are built in suitable lengths for multiple car dumping, with a number of automatic and semi-automatic drive and control features.

No matter how large or how small your ne . . . no matter what type of cars you use, how y you use, or how you want them dumped . . . e's a *proved* Nolan Mine Car Dumping and Con- Device to aid production for you.

lan Single and Multiple Rotary Car Dumpers will ly dump four to six cars a minute, coupled or un- pled. Sturdy construction is a feature of the Nolan Dumper. Rings and trunnions are made of alloyed cast steel carefully machined; the cage structure is of heavy structural sections and plates. Heavy rigid base frames maintain wheel bearings in permanent alignment and carry baffle sheet supports, making entire unit compact and quickly installed.

Nolan Rotary Car Dumpers turn a full revolution at each operation. Starting is by a convenient hand lever operating mechanical rail aligning stop and motor contactor. The dump completes its cycle automatically. The dumping principle allows the handling of material with rigid, solid body mine cars, resulting in cheaper first cost, reduced maintenance, and far less coal degradation.

Write for complete information on Nolan Rotary or Gravity Car Dumpers, Trip Feeders, Car Hauls, Automatic Cagers, Platform and Self-Dumping Cages, Cushioned Car Stops, and Mine Car Retarders.

NOLAN

THE MINING SAFETY DEVICE CO.

★ BOWERSTON, OHIO ★

Combustion Service Started by Koppers

Establishment of a department to provide special postwar engineering, combustion and research service to industrial, utility and domestic customers of the Koppers Coal division of Eastern Gas & Fuel Associates has been started, according to Walter Rothenhoefer, general manager of sales. Graham Granger, of Koppers Coal, assigned to head the new department, is a graduate of Georgia School of Technology with a degree in engineering and for nearly ten years was assistant to the general manager and combustion engineer for the Hershey Corp. He will head an organization of combustion engineers and service men who will be assigned to Koppers district offices.

His department will have the benefit of Koppers research at the Mellon Institute of Industrial Research as well as at Koppers' own laboratories, including their stoker research laboratory.

While creation of the department is now under way its completion is not expected until postwar manpower conditions make it possible to complete the staff.

•

Lake Coal Traffic Near Schedule

Shipments of coal to Great Lakes docks during the navigation season to Sept. 3 almost equalled scheduled requirements, Solid Fuels Administrator announced Sept. 16. Estimated needs of coal for the regions that get their winter's solid fuels via the Lakes total about 62,554,000 tons, Mr. Ickes said. About 40,651,034 tons of coal, including vessel fuel, had been forwarded by water to the Great Lakes docks as of Sept. 3. This leaves about 21,902,966 tons, including anthracite, or about 35 percent of the total estimated requirements, to be moved in the third of the navigation season remaining after that date.

•

Canadian Roads Plan To Conserve Coal

Plans were laid by officials of four Canadian railways meeting in Toronto to save a million tons of coal a year on the lines and in railway buildings for diversion to vital war industry. Canadian National Rys., Canadian Pacific Ry., Temiskaming & Northern Ontario and Toronto & Hudson Bay Ry. were represented at the conference.

A. E. McGruer, supervisor of stationary boiler plants for Eastern Canadian Pacific Ry. lines, said that railroads account for 20 percent of the Dominion's coal consumption and that therefore it was imperative to take steps to meet requests for conservation from the Dominion Fuel Controller. Overheating of coaches and depots, overloading of tenders and excessive blowing of safety valves were listed among the 120 ways in which the carriers

English WEDGE WIRE Screens are now American-Owned, American-Manufactured

The scores of users of Wedge Wire Screens, and other preparation plants throughout the United States will be happy to learn that the former English Wedge Wire Corporation is now American-owned, and that these screens are now being manufactured in this country.

This will mean faster service and more satisfactory attention to those who have preferred this make of preparation screen.

SAME DESIGN . . . SAME HIGH QUALITY

We will retain the same proved features of design and high quality which have made Wedge Wire Screens popular to so many users. We also plan to improve our service to you which may have been slowed up due to unavoidable shipping problems. All of you who are using Wedge Wire Screens can be assured friendly, prompt service in the future, and the same fine quality products to which you are accustomed.

WEDGE WIRE DESIGN PREVENTS CLOGGING

Due to the wedge shape of the cross strands and the downward enlarging opening, clogging of materials is practically eliminated. The metals used in Wedge Wire Screens are available in a wide variety.

To old friends and new, we invite you to write us for facts about Wedge Wire Screens for your preparation plants.

YOUR REQUEST WILL BE PROMPTLY ANSWERED

MANUFACTURERS OF PREPARATION SCREENS . . . . . .

WEDGE WIRE CORPORATION

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can waste coal. The reduction in consumption, it is estimated, will save $3,000,000. The roads will pool fuel-saving knowledge and all department heads will be asked to cooperate.

The British Columbia Government is moving closer to development of coal in the Peace River area, with the possibility that there will be an extension of the Pacific Gas & Electric Co. to get it out. E. C. Carson, Minister of Mines, Trade and Industry, lately returned from a survey of the area, on which he will report to Premier John Hart, said the coal "is marvelous." According to an engineer, reporting on behalf of a syndicate a year ago, "the coal probably underlies a length of 25 miles along both sides of the river for a minimum area of 50 square miles, while outcrops of two of the larger seams were definitely traced and mapped for 6½ miles. The exposures along 11 miles reveal ten seams of commercial thickness for totals varying from 33 to 51 ft. of clean coal."

•

U. P. Orders 35 New Iron Horses

Thirty-five new coal-burning locomotives, representing an investment of $10,000,000, have been purchased by the Union Pacific R. R. from the American Locomotive Co., according to W. M. Jeffers, president of the railroad. Twenty-five of the new engines will be used in high-speed heavy freight duty and ten for passenger service.

Of the new locomotives, five are to be the U. P. 4,000 class, 4-8-8-4 type, known as the "Big Boy" (*Coal Age*, September, 1944, p. 66). Designed especially for heavy freight service, they will be used between Ogden, Utah, and Green River, Wyo., where 20 "Big Boys" already are in use. The remaining freight units will be high-speed Challenger engines of the 3,000 class, 4-6-6-4 type, of which the company has 85 operating in Wyoming.

The ten high-speed passenger units will be in the 800 class, 4-8-4 type, of which U. P. has 35 in use between Omaha, Salt Lake City and Pocatello, Idaho. Delivery of the new locomotives is to be completed in November.

•

Output Groups Named At Anthracite Mines

Production committees to work under guidance of the Solid Fuels Administration for War have been set up at 15 anthracite collieries in District 1, United Mine Workers of America, with other local unions about to meet to take similar action. Members of committees are being reported to the Wilkes-Barre (Pa.) office of SFAW as rapidly as the groups are organized, not only in District 1 but also in Districts 7 and 9.

As soon as enough committees have been named, several industry-wide programs designed to maintain a steady high rate of coal production will be inaugurated. The campaigns will strive to be educational and will operate wholly within

SWAP YOUR SLEDGE HAMMER ... FOR A LEVER!

USE THE PUSHING, HEAVING ACTION OF RED CROWN'S DISTRIBUTED POWER

● MANY mining explosives act like a sledge hammer, delivering a concentrated, shattering blow that is destructive around the drill hole and ineffective a little distance away.

Entirely different is the action of King Powder's Red Crown, which works more on the principle of the lever. Red Crown exerts a pushing, spreading, heaving action that displaces the coal without pulverizing it. You get coal in large, firm lumps with a minimum of pin cracks. And Red Crown distributes its power evenly throughout the cut.

If you have never seen Red Crown in action, why not arrange for a demonstration in *your* mine, under *your* particular operating conditions? Once you have witnessed the performance of this patented, surface-sensitized Class A Permissible, you will never be satisfied with sledge hammer explosives again. For full information, see your King Powder salesman or get in touch with us direct.

THE KING POWDER COMPANY, INC.
CINCINNATI 1, OHIO
INCORPORATED 1878

RED KING EXPLOSIVES CROWN

THE PATENTED, SURFACE-SENSITIZED PERMISSIBLE

the bounds of the working agreement between the union and the operators.

Committees formed thus far in District 1 are: Local 8005, Ewen colliery, Pennsylvania Coal Co.; Local 1035, Forest City colliery, Gateway Coal Co.; Local 623, Buttonwood colliery, Glen Alden Coal Co.; Local 1682, Gravity Slope, Hudson Coal Co.; Local 6998, Mineral Spring colliery, Franklin Coal Co.; Local 1670, Underwood colliery, Pennsylvania Coal Co.; Local 7281, Sullivan Trail colliery, Pagnotti Coal Co.; Local 1167, Glen Lyon colliery, Susquehanna Collieries Co.; Local 1417, Dial Rock colliery, Dial Rock Coal Co.; Local 311, Nottingham colliery, Glen Alden Coal Co.; Local 1691, Eddy Creek colliery, Hudson Coal Co.; Local 7301, Westmoreland colliery, Lehigh Valley Coal Co.; Local 719, No. 9 colliery, No. 9 Coal Co.; Local 452, Harry E colliery, Pagnotti Coal Co.; Local 7499, No. 6 colliery, Jermyn-Green Coal Co.

•

Further Pipe Laying Under Consideration

With pipe laying for the 1,265-mile project of the Tennessee Gas & Transmission Co. scheduled to be completed Oct. 1 and testing finished in time to begin transmission of gas by Oct. 15, certain spurs and extensions for which applications are pending before the Federal Power Commission or which were included in the original plan submitted call for additional construction.

These include a total of 97 miles of 8-in., 10-in. and 16-in. spurs to serve Russellville, Ky., to be built by the Kentucky Natural Gas Co.; to Louisville, Ky., to be built by the Louisville Gas & Electric Co., and to Nashville, Tenn., to be built by Tennessee Natural Gas Lines, Inc. A 200-mile extension of the Tennessee Gas & Transmission Co. project at the Corpus Christi (Texas) end as well as looping to provide for increased demands have been mentioned as possibilities for early consideration.

The Pacific Lighting Corp. is reported to have considered a line from the Hugoton pool in Kansas and Oklahoma to California, which may use 26-in. pipe.

•

Authorize Material For Domestic Stokers

Material has been authorized for production of 37,500 domestic-type coal stokers during the fourth quarter of 1944, the War Production Board's Office of Civilian Requirements announced Sept. 12. Material also has been authorized for production of 6,500 commercial and industrial stokers during the fourth quarter. WPB had earlier announced fourth-quarter production in that category at 2,500, but the figure was raised because of acute need.

All coal- and wood-burning stoves for cooking and heating will be removed from ration restrictions on Oct. 15. The removal is effective immediately, because of the backlog of these units. Oil and gas stoves continue on the ration list.

New Owner Reopens Glen Carbon Mine

Glen Carbon mine, near Collinsville, Ill., operated by the Chapman Coal Co.—Ben Chapman, president—reopened for production in the third week of September. From a former hand-operated mine, with steam power, it has been transformed since its purchase last March into one electrically powered, with underground mechanical loading. About $35,000 has been spent on improvements, including retimbering of the shaft and a new office and new scale. When production gets under way, 60 to 70 men will be employed.

•

High Splint to Expand

High Splint Coal Co., High Splint, Ky., has announced a $500,000 expansion program, largest single mine project in Harlan County in several years. Jack Taylor, general manager of the company, said two mechanical mines would be opened in the Darby seam and a new five-track all-steel tipple and new office building constructed.

Contract for the grading and track has been let to the Kodell Construction Co., Winchester, Ky., with work to start immediately.

•

Spur for W. Kentucky

Louisville & Nashville R.R. has been authorized by the Interstate Commerce Commission to construct a 3.5-mile spur from Millport, in Muhlenburg County, running south to reach new coal-mining properties in western Kentucky.

•

Association Activities

Southern Wyoming Coal Operators' Association has elected as president John Lucas Sr., Rock Springs, and as secretary-treasurer W. J. Thompson, Denver.

•

Tennessee Stripper

Sullivan Coal Co., Knoxville, Tenn., headed by J. B. Sullivan, former engineer for the Tennessee Valley Authority, has been organized for a strip-mining operation near Soddy, Tenn. It has applied for a permit to erect a tipple on Soddy Creek so that shipments may be made by barge. Plans call for production of 500 tons of coal per day. Bulldozers, power shovels and draglines will be used in getting out the coal.

•

Bootleg Output Wanes

Indicative of the advantage that operators, land owners and lessees in the anthracite region of Pennsylvania are taking of available means to reduce bootleg operations are the granting of several injunctions by Schuylkill County courts since December, 1943, restraining bootleg mining; cessation of production by other bootleg holes because the State Department of

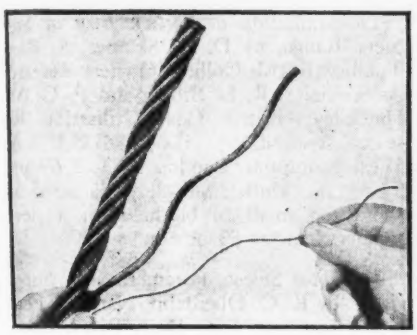
"What can Macwhyte PREformed Wire Rope do for Me?"

Here are specific ways you benefit from the use of Macwhyte PREformed wire rope.

First, you get longer wire rope service for 3 reasons:

1. PREformed has less internal fatigue.
2. PREformed has less internal friction.
3. PREformed has better balance.

Each wire and each strand are PREformed before being laid into the finished rope. The detrimental effects of internal friction and internal fatigue, two of wire rope's greatest destroyers, are reduced to a minimum in Macwhyte PREformed. There is perfect balance. Each strand and wire carries its share of the load.



Second, you get lower cost per load carried.

In Macwhyte PREformed, every strand in the wire rope is under uniform tension. There is no "early wearing out" of some strands while the others "loaf." This perfect balance makes possible lower cost per load carried on the job.

Third, you get fewer shut-downs, less trouble.

Fewer shut-downs are the rule, because PREformed lasts longer. In these times, lost man hours due to repairs or replacements can be disastrous. PREformed helps prevent this.

Less trouble is encountered because PREformed is flexible, easy to handle. The perfect balance of strands means that PREformed is kink-resistant, very easy to take off the reel and put on your equipment.

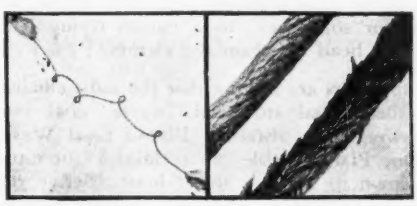


Figure A *Figure B*

Fourth, you have less chance of rope loss or workman injuries.

Macwhyte PREformed is not likely to curl up *(Figure A)* during unreeling and installing. Therefore, the risk of kinking and permanently damaging the rope is greatly diminished.

Nor does PREformed wire rope wicker and become dangerous to handle *(Figure B)*. A wire broken from wear in a PREformed rope lies in place, does not wicker out to injure workmen's hands.

In addition to these 4 specific benefits, add this 5th: Macwhyte Internal Lubrication that goes around every wire in every strand of Macwhyte PREformed wire rope.

Inside bearing surfaces of wires are thus protected against friction and corrosion. All spaces between wires are filled with lubricant to keep out moisture and resist ordinary acids. This tenacious, heavy lubricant Macwhyte uses, clings to wires unaffected by the hottest, coldest, driest, or most humid temperatures.

Macwhyte engineering experience may help you. Tell us your problem. We'll assist you in getting the *correct* rope for your equipment.

MACWHYTE PREformed WIRE ROPE Plus Internal Lubrication Selected Steels Tested-Proved

The correct rope for your equipment

NO. 754

MACWHYTE COMPANY

Wire Rope Manufacturers

ARMY E NAVY

2931 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope · MONARCH WHYTE STRAND Wire Rope · MACWHYTE Special Traction Elevator Rope · MACWHYTE Braided Wire Rope Slings · MACWHYTE Aircraft Cables and Tie-Rods · MACWHYTE Stainless Steel Wire Rope · MACWHYTE Monel Metal Wire Rope

Mines insisted on compliance with the mining laws of the State; and closing of other holes by blasting and use of bulldozers by land owners and lessees. About 2,000 men are now employed in this activity compared with around 10,000 in 1941.

•

Darr Coal Co. Buys Fordson Mine

Twin Branch mine, of the Fordson Coal Co., near Welch, W. Va., closed since 1933, has been purchased by the Darr Smokeless Coal Co.—R. E. Brockman, president—and is to be ready for production about Jan. 1. Included in the transaction were about 200 homes at the mine for employees and a lease of 5,000 acres of coal land in the Davy Sewell seam. The mine, owned by the Ford Motor Co., has a capacity of 2,000 tons per day.

•

Coal Publications

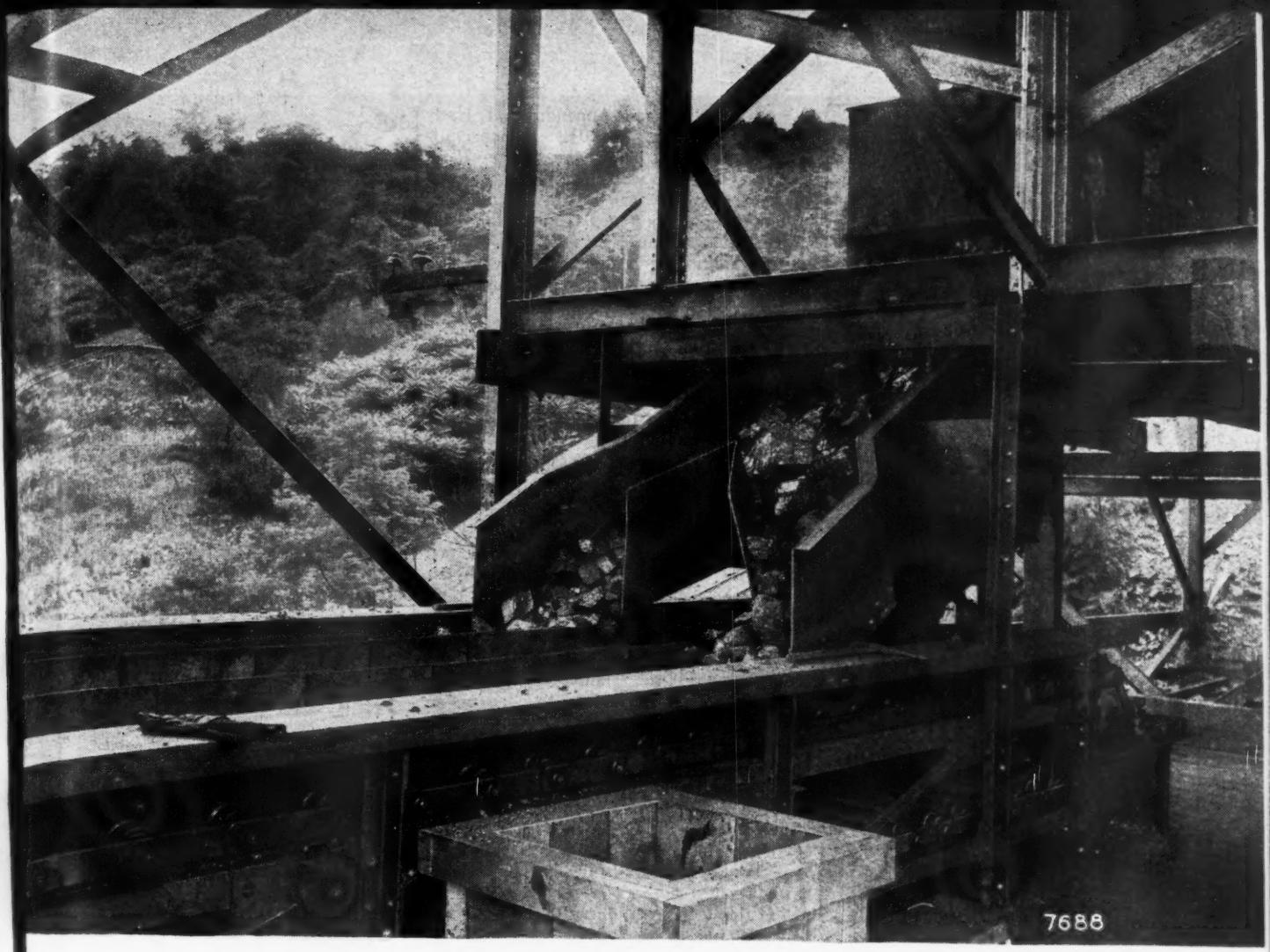
Determination of Particle Size in Sub-Sieve Range, by D. G. Skinner, S. Boas-Traube (British Colliery Owners Research Association), R. L. Brown and P. G. W. Hawksley (British Coal Utilisation Research Association). C2955, B.C.U.R.A., West Brompton, London, W.C.2 69 pp., 5½x8½ in., cloth. Sub-sieve particles are those too small to be held on a sieve; smaller than say 53 or 66μ.

How to Select Foremen and Supervisors, by R. C. Oberdahn, National Foremen's Institute, Inc., Deep River, Conn. 53 pp., 5½x8¼ in., cloth. Price, $2. Selection guarantees a foreman better suited for training, which is important, because employers always must have a good foundation on which to build.

Coal Mine Modernization, 1944 Year Book, American Mining Congress. 300 pp., 6x9¼ in.; artificial leather cover. Price, $2. Convention Proceedings, 1944, with Coal Division Reports.

Labor Baron, A Portrait of John L. Lewis, by J. A. Wechsler. William Morrow & Co., New York. 278 pp., 5½x8⅞ in. Price, $3. A fair presentation of the labor leader backed by study. It limns him realistically. Statistics, chronology and wage scales it ignores, obsessed solely with the purpose of sketching the imperious labor leader himself, his ups and downs, his ambitions and frustrations. The author records that Lewis "helped dig for the crushed and mutilated bodies of 400 miners caught in an explosion at Hanna" and that this disaster Lewis "has ften cited as inspiring his passion for mine-safety legislation." This distressing explosion destroyed 169, not 400, lives. There is no record that Lewis ever worked for the Union Pacific Coal Co., and men who were on the ground at the time of the disaster state positively that he had no connection with the work of recovery.

A Study of Summer Air Conditioning With Water Sprays to Prevent Roof Falls at the Beech Bottom Coal Mine, West Virginia, by E. L. Fish, L. A. Turnbull



The S-A picking table pan conveyor shown is 72 inches wide, 21 feet long and handles run-of-mine coal. The loading spout and grizzly places fines in the center and lumps on both sides for convenience in picking and grading.

AT EVERY STEP FROM MINE TO CAR

S-A *Can Help*

Producing coal at a profit depends largely on utmost efficiency at every handling stage. That explains why so many of the Nation's operators choose to work with Stephens-Adamson material handling engineers.

Whether it's a picking table pan conveyor, arranged for rapid, easy grading of coal . . . or belt conveyors deep in a mine . . . or elevators, screens, feeders, crushers, etc. . . . S-A can provide the exact equipment needed.

This complete line of manufactured machinery, together with the engineering skills required to assemble machinery into efficient handling systems, are available to help you improve or expand your facilities. Write us today.

STEPHENS-ADAMSON MFG. CO.

RIDGEWAY AVENUE, AURORA, ILLINOIS — LOS ANGELES, CALIF. ★ BELLEVILLE, ONT.

Designers and Manufacturers of All Types of

BULK MATERIAL HANDLING EQUIPMENT

and A. L. Toenges. Appendix by I. Hartmann. 37 pp., 8x10½.; mimeograph. Laboratory tests show the roof rock at Beech Bottom is weakened more by atmospheric moisture than by atmospheric heat. Three out of four men required for haulageway maintenance are no longer needed. Air conditioning is desirable in winter as well as in summer. Constant humidity is desirable.

•

Coal Mine Fatalities Resume Upward Trend

Accidents at coal mines of the United States caused the deaths of 152 bituminous and 12 anthracite miners in July last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 48,930,000 net tons, the accident death rate among bituminous miners in July last was 3.11 per million tons, compared with 1.48 in the preceding month and 2.22 in July, 1943.

The anthracite fatality rate from accidents in July last was 2.39, based on an output of 5,016,000 tons, against 1.78 in the preceding month and 3.04 in the seventh month of 1943.

For the two industries combined, the accident fatality rate in July last was 3.04, compared with 1.51 in the preceding month and 2.30 in July a year earlier.

Fatalities during July last, by causes and states, as well as comparable rates for the first seven months of 1943 and 1944, were as follows:

U. S. COAL-MINE FATALITIES IN JULY, 1944, BY CAUSES AND STATES

State	Underground: Falls of Roof	Falls of Face	Haulage	Gas or Dust Explosions	Explosives	Electricity	Machinery	Mine Fires	Other Causes	Total Underground	Shaft	Open-Cut	Surface	Grand Total
Alabama	1	..	1	..	1	..	..	..	..	3	..	..	..	3
Colorado	..	..	1	..	..	..	..	..	..	1	..	..	..	1
Illinois	6	2	3	..	1	..	..	..	..	12	..	..	..	12
Indiana	..	..	1	..	..	..	..	..	..	1	..	..	..	1
Kentucky	13	..	2	..	..	1	..	..	..	16	..	..	1	17
Maryland	1	..	..	..	..	..	..	..	..	1	..	..	..	1
Missouri	..	..	..	..	..	1	..	..	..	1	..	..	..	1
New Mexico	..	..	..	6	..	..	..	..	..	6	..	..	..	6
Ohio	3	..	..	..	..	..	..	66	..	69	..	1	1	71
Oklahoma	2	..	..	..	..	1	..	..	1	4	..	..	..	4
Pennsylvania (bit.)	11	..	..	..	..	..	1	..	..	12	..	1	..	13
Tennessee	..	..	..	..	..	1	..	..	..	1	..	..	..	1
Virginia	2	..	1	..	1	..	1	..	..	5	..	..	..	5
West Virginia	7	..	4	..	1	1	..	1	..	14	..	1	..	15
Wyoming	..	..	..	..	..	..	..	..	1	1	..	..	..	1
Total bituminous	46	2	13	6	4	5	2	67	2	147	..	3	2	152
Pennsylvania (anth.)	5	..	2	..	..	..	..	..	..	7	2	2	1	12
Grand total	51	2	15	6	4	5	2	67	2	154	2	5	3	164

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*

January-July, 1943 and 1944

Cause	Bituminous: Number Killed		Bituminous: Killed per Million Tons		Anthracite: Number Killed		Anthracite: Killed per Million Tons		Total: Number Killed		Total: Killed per Million Tons	
	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944
Underground:												
Falls of roof and coal	407	313	1.210	0.850	62	47	0.177	0.123	469	360	1.263	0.886
Haulage	141	123	.419	.334	19	15	.054	.039	160	138	.431	.340
Gas or dust explosions:												
Local	23	6	.068	.016	1	1	.003	.003	24	7	.065	.017
Major	96	22	.286	.060	...	...	....	....	96	22	.259	.054
Explosives	19	8	.057	.022	6	9	.017	.024	25	17	.067	.042
Electricity	25	20	.074	.054	...	2	....	.005	25	22	.067	.054
Machinery	13	19	.039	.052	1	...	.003	....	14	19	.038	.047
Shaft	6	3	.018	.008	...	4	....	.010	6	7	.016	.017
Miscellaneous	21	86	.062	.234	10	9	.029	.024	31	95	.083	.234
Stripping or open-cut	16	16	.048	.043	8	4	.023	.010	24	20	.065	.049
Surface	37	25	.110	.068	11	7	.031	.018	48	32	.129	.079
Total	804	641	2.391	1.741	118	98	.337	.256	922	739	2.483	1.819

* All figures subject to revision.

A LOT OF PROTECTION
with Automatic Reclosing Circuit Breakers

When a mining electrical network is viewed as a complete system, the protection afforded by automatic reclosing circuit breakers is seen to be just about indispensable under today's mining conditions.

This is because the total protection is so broad. In substations, Type KSA's guard generating, converting or rectifying equipment and do it with dependability, with minimum maintenance and with rapid, accurate response. Out on the feeders connecting the substations and on the fringes of the system, Type KSC's protect against fire hazards on the feeders and protect the feeders and the motorized equipment operated off them. Current is apportioned to each section in relation to the need for it.

The end result is a great saving in time, which in these days and others to come, represents more production.

Representatives in Principal Mining Areas

I-T-E

AIR SWITCHGEAR

IMMERSED IN AIR — ENCASED IN STEEL

The Army-Navy "E" for Production Excellence

CIRCUIT BREAKER CO., PHILADELPHIA 30, PA.

TIPS FROM MANUFACTURERS

Scraper

LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa, offers the new Airbornescraper, a pocket-size edition of 1¾-cu.yd. struck capacity or 2-cu.yd. heaped capacity, designed for loading into the door of a transport plane or glider. The rear of the frame is so constructed that the rear wheels can be located either inside or outside the width of the cut. In the latter position greater stability is provided for side sloping. The scraper is able to make a full 90-deg. turn or less within a circle diameter of 20 ft. without overturning.

Designed to be pulled now by tractors employed by the airborne engineers, it will be suitable for use after the war with the small Caterpillar D-2 tractor, although its size will be increased proportionately to the tractor. Because of its lightweight design and low price, it will be suited for many jobs where a small, lightweight tractor-scraper unit is desirable.

•

Insulating Tape

"Fibron," a new many-purpose plastic tape of widely divergent applications, is offered by the Irvington Varnish & Insulator Co., Irvington 11, N. J., as the most recent addition to its line of insulating products. It is used for insulating wires, cables and electrical equipment; for splicing cables and for protecting wiring, piping and equipment exposed to caustic or corrosive fumes, oil, grease, acids, alkalis or moisture.

Said to be remarkably flexible and elastic, Fibron tape is manufactured from "Vinylite" resin, a product of the Union Carbide & Carbon Corp. It is heat-sealing, flame-resistant and high in dielectric and mechanical strength, the company states.

•

Diesels for Mining

Sterling Engine Co., Buffalo, N. Y., offers a new line of diesel engines expected to find wide application in the mining field. The new line ranges from 250 to 650 hp. Known as the Sterling Viking diesel, an important feature of the engine's design is that it provides a power plant with the same over-all dimensions and same weight as most gasoline engines of equivalent horsepower and is interchangeable with Sterling's Viking gasoline engine.

Despite its compactness it is easily accessible, permitting maintenance work and repairs to be performed with the least possible difficulty and loss of time, it is said.

"The quantity of fuel consumed by the new diesel," said Addison E. Vars, Sterling president, "is considerably less than in gasoline power plants. Actually it uses two-thirds or less than the quantity consumed by a gasoline engine of the corresponding size, and of course the fuel used costs far less per gallon than gasoline."

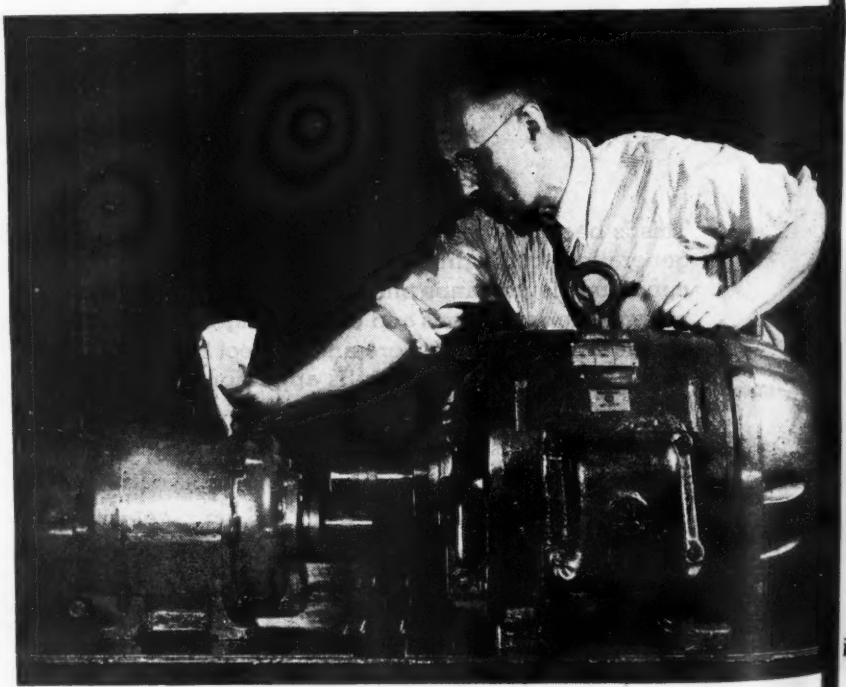
•

Insulating Varnishes

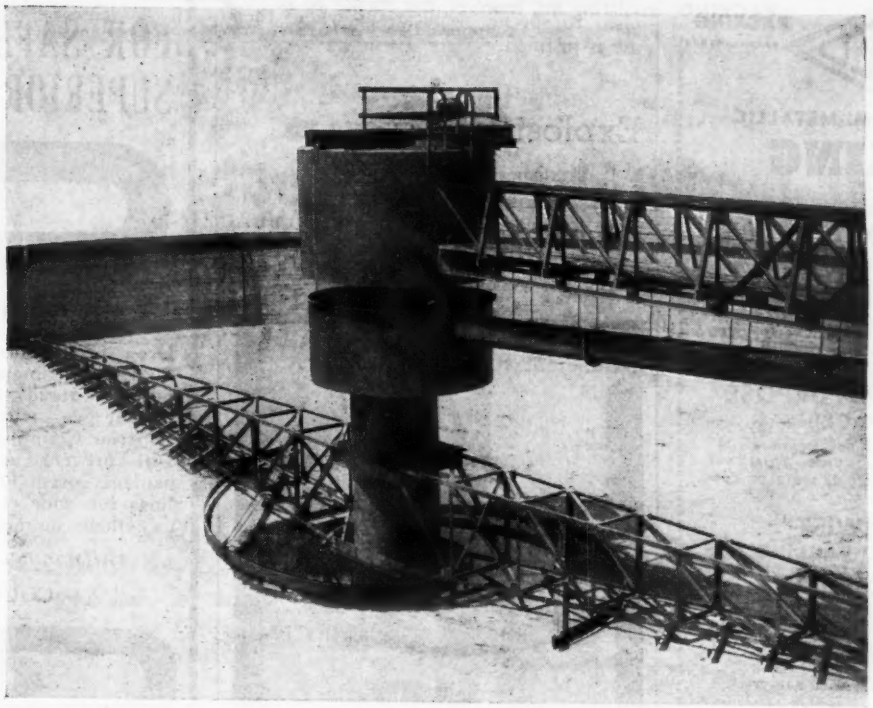
As much as 50 percent reduction in weight of electric equipment is said to be possible where design limitations are based on insulating temperature by using the new Silicone insulating varnishes offered by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. These high-temperature insulations also are declared to make possible a substantial increase in the output of small motors using the same frame, where the operating temperature can be raised, and offer the additional advantages of ability to operate at higher ambient temperature and to increase greatly life when operated at present temperature conditions.

New high-temperature insulations have been developed utilizing recently developed Silicone resins and varnishes, making it possible to produce electrical equipment with greater thermal endurance; as high as twenty to one on laboratory tests. Physically, they are quite similar to conventional resins, varnishes and organic structures but differ in that they do not readily decompose at temperatures of the order of 200 deg. C.

Over two years' experience on actual equipment, says the manufacturer, confirms extensive laboratory tests showing these materials to be promising. Air-cooled transformer life has been increased and output improved when insulated with high-temperature materials. Several hundred are now in service. Where temperature, or size and weight as determined by temperature, are important factors in electrical equipment design the problem should be examined in the light of these recently developed insulating materials, according to the manufacturer. Silicone insulation should not be considered a panacea for all



Though the motor on the left weighs 210 lb. and that on the right 410 lb., both produce 10 hp. at 1,750 r.p.m. Higher operating temperature makes this possible. The left-hand unit is made with high-temperature Silicone insulation and operates at 175 deg. C. to hot-spot temperature, while that at the right is made with Class A insulation and operates at 105 deg. C.



SILT THICKENERS

WATER CLARIFIERS

HARDINGE EQUIPMENT

	Bulletin No.
Agitators	31-C
Clarifiers	31-C
Classifiers, Air	17-B
Classifiers, Counter-Current	39-A
Classifiers, Hydro	31-C
Conveyors, Rotary	44
Density Stabilizer	42
Digesters	35-B
Dryers	16-C
"Electric Ear"	42
Feeders, Belt	33-C
Feeders, Constant Weight	33-C
Feeders, Disc	33-C
Feeders, Drum	33-C
Feeders, Non-Flooding	33-C
Feeders, Weight Recording	43
Filters, Sand	30-A
Metal Reclamation	8-A
Mills, Batch	19-A
Mills, Conical Ball	13-D
Mills, Conical Pebble	13-D
Mills, Rod	25-B
Mills, Tube	18-A
Mixers, Slurry	31-C
Pumps, Diaphragm	32
"Ruggles-Coles" Dryers	16-C
Kilns and Coolers	16-C
Scrubbers, Conical	37
"Thermomill"	17-B
Thickeners	31-C

Designed for large volume flow and heavy tonnages of solids, which require features proven in HARDINGE UNITS such as:

Auto-Raise—for full operating safety.

Combined Spiral and Segmental Scrapers—for positive and quick removal of solids.

Rugged Ball Bearing Drive Head—for 24 hour service year in and year out.

Ask for our field Engineer to call.

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COMPANY, INCORPORATED - YORK, PENNSYLVANIA

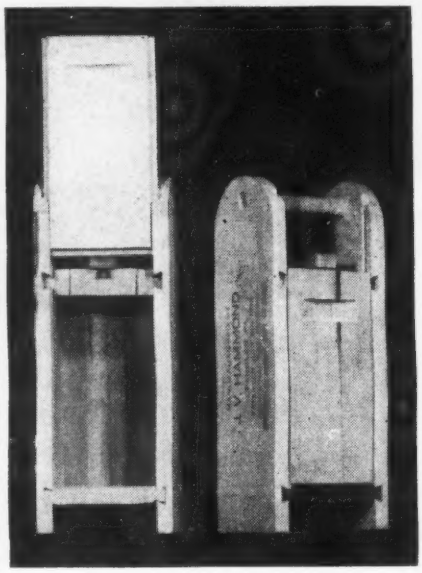
New York, 122 East 42nd Street Chicago, 205 West Wacker Drive San Francisco, 501 Howard Street Toronto, 200 Bay Street

insulating ills, however, but should be applied to specific applications where their use is justified.

•

Explosives Boxes

J. V. Hammond, Spangler, Pa., offers safety explosives boxes constructed entirely of wood, having no metal parts. They are of tongue-grooved and dovetailed construction, having handle for carrying

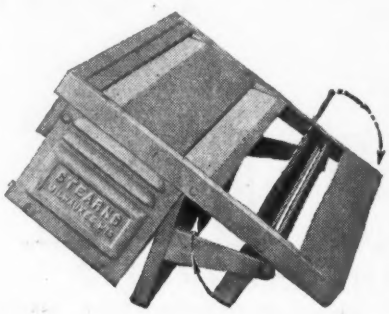


and are equipped with automatic lock, using a rubber band for a spring. Impregnated with paraffin to make them moisture-proof, they have been approved by the Pennsylvania Department of Mines.

•

Spout-Type Magnet

A new spout-type magnet known as the Stearns Super Class AAA is offered by the Stearns Magnetic Mfg. Co., Milwaukee 4, Wis. Some of its features are said to be: quick, positive acting armature insures opening and closing of tramp-iron discharge gate that is entirely automatic, opening when current is shut off and closing when current is turned on; simple-design gate lever arm; clean tramp-iron discharge gate designed to prevent dirt collecting and hindering efficient operation; improved strong magnet for effective separation; enlarged bronze bearings on gate actuating rods to give long life and make wearing parts easily accessible for possible repairs or replacement; tramp-iron wells to provide high intensity, double-pass magnetic



"The average non-mechanized mine won't be able to live after the war"

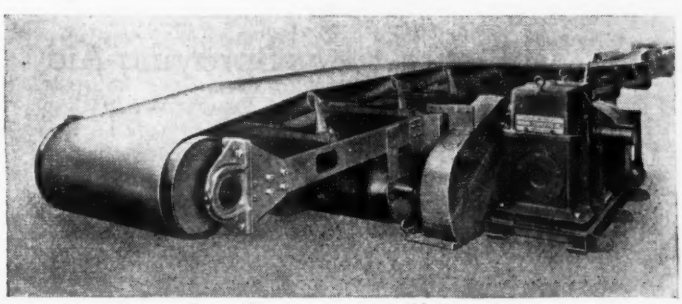
. . . says the president of a large coal mining concern

It's a matter of dollars and cents — and sense. Labor rates are fixed; ceiling prices are set. If you are to continue to exist, some way will have to be found to strike a balance between the two. The only way open is to increase output per man per day. That can be done in only one way —through mechanization!

In the mine, this can be done with the Robins Mine Conveyor. This portable unit grows as work on the face progresses—not by means of tools and hard work, but by merely dropping-in additional sections. This Mine Conveyor is a sturdy unit—it handles up to 300 tons per hour over lengths as great as 3000 feet. It is a genuine Robins Conveyor—not a makeshift or a toy; just to give you an idea, the Idlers are 4" in diameter. It is adaptable—motor and Takeup can be mounted on either side; and that Takeup is in the head section—no crawling the full length of the Conveyor to take up slack. The Robins Mine Conveyor has 25 distinctive features—including a belt line only 15" above the floor.

In the tipple, size your coal with Robins Vibrating Screens. Robins originated many basic elements of Screen operation, including the circle-throw principle, now so popular—and best exemplified in the Robins Gyrex. The Robins line is so broad and so varied that you can satisfy all your screening needs at this one source.

Whatever your need for mechanical conveying, hoisting, storing, crushing, sizing and distributing, get in touch with Robins. An engineer from the nearest of our ten offices will gladly call for consultation without cost or obligation. When inviting his call, please address Dept. **CA-10.**



ENGINEERS • MANUFACTURERS • ERECTORS

ROBINS CONVEYORS
INCORPORATED
Founded in 1896 as Robins Conveying Belt Co.
PASSAIC • NEW JERSEY

MATERIALS HANDLING MACHINERY

ROBINS *makes:* BELT CONVEYORS • COAL AND ORE BRIDGES • BUCKET ELEVATORS • CAR AND BARGE HAULS • CAR DUMPERS • CAR RETARDERS • CASTINGS • CHUTES • CONVEYOR IDLERS AND PULLEYS • CRUSHERS • FEEDERS • FOUNDRY SHAKEOUTS • GATES • GEARS • GRAB BUCKETS • PIVOTED BUCKET CONVEYORS • VIBRATING SCREENS • SCREEN CLOTH • SELF-UNLOADING BOAT MECHANISMS • SKIP HOISTS • STORAGE AND RECLAIMING MACHINES AND SYSTEMS • TAKEUPS • LOADING AND UNLOADING TOWERS • TRIPPERS • WEIGH LARRIES • WINCHES • WINDLASSES

FOR MATERIAL AID IN MATERIALS HANDLING . . . . . . **It's ROBINS**

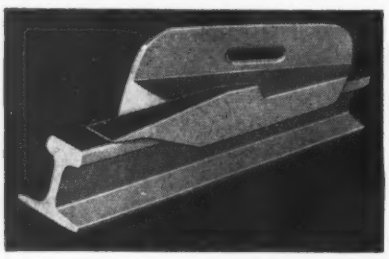
action on material and louver-type nonmagnetic side plates to allow ample ventilation to cool the coils but keep out injurious particles.

These magnets are furnished in widths from 8 to 20 in. in the AAA series but can be had in larger sizes for coal and other industries.

•

Mine-Car Derail

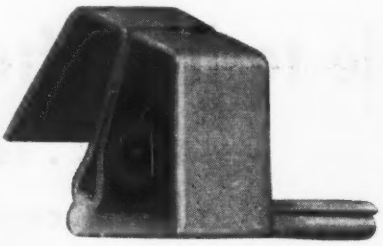
Portable Lamp & Equipment Co., 420 Blvd. of the Allies, Pittsburgh 19, Pa., has developed a new type mine-car derail. Designed so that it operates like a switch, this derail is said to eliminate the danger of the car wheels jumping over the device. No tools are necessary to install the



device; simply place the derail on the rail and tighten by means of a roller binding on the rail head. It is quickly and easily released by kicking in the opposite direction. Available in both "lefts" and "rights," as required.

Trolley-Guard Support

Mosebach Electric & Supply Co., 1150 Arlington Ave., Pittsburgh 3, Pa., has developed a new inexpensive Mesco trolley-guard support. The new product is designed to grip the trolley wire as illustrated. It is made of ⅛x2-in. steel, in two



pieces, held together by ⅜x¾-in. carriage bolts. The supports are lead-coated to prevent rusting.

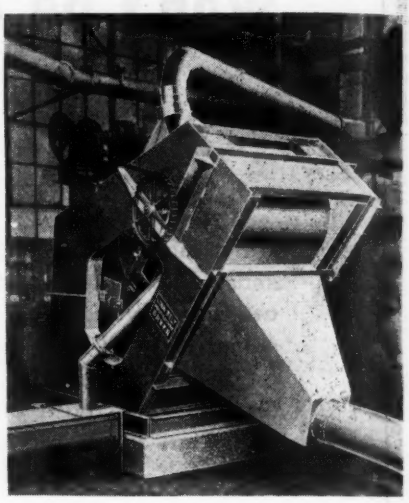
It is recommended that the supports be placed 4 or 5 ft. apart. The rubber is then placed over the supports, forming a guard over the wire and warning anyone striking the guard.

•

Dryer

Link-Belt Co., Chicago, offers a new type of dryer, called the Multi-Louvre dryer, for low-cost drying (or cooling) of bulk materials that do not require long retention periods. The new dryer is described as fully inclosed, containing moving louvers supported on power-operated endless chains. The function of the moving louvers is to present the material as it flows, to obtain the most efficient drying (or cooling) action.

This mixing action and thorough contacting of the material with the heated air introduced into the unit is said to promote efficient drying and assure a uniformly dry material. Air drawn through



the moving mass of material and exhausted at the top of the dryer can be heated to the temperature best suited to the material being dried. Ample passages between the louvers permit air circulation at low velocity.

•

Heat-Resisting Paint

Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y., offers Triple-A high-heat-resisting paint for surfaces subjected to high heat, to obtain maximum protection and decoration of the surfaces on which it is applied. Complete instructions are given regarding application, which, it is pointed out, should be closely followed for satisfactory results.

•

Spraying Aid

Johnson-March Corp., 52 Vanderbilt Ave., New York 17, N. Y., offers Oiladd, a concentrated wetting and dispersing additive to improve spraying oils for dustless treatment of coal. Mixed with oil at rate of 5 percent, it is said to increase spread, aid adhesion and reduce viscosity. It can be added at the mine before the oil is sprayed and is said to be easily miscible; no special mixing or blending apparatus is necessary.

•

Hole Cutters

A new all-purpose adjustable hole-cutting tool is offered by Bruno Tools, Beverly Hills, Calif. This tool quickly cuts smooth holes in wood, steel, brass, hard rubber, aluminum, fiber, plastics and problem materials that might necessitate use of torches or other expensive equipment. Two sizes

are available, each equipped with an easily resharpened high-speed steel blade. One model cuts holes to any diameter from $\frac{5}{8}$ to $1\frac{1}{4}$ in. through $\frac{1}{8}$-in. thickness. The other model covers all expansions from 1 to $2\frac{1}{2}$ in. through thicknesses up to $\frac{3}{8}$ in. The tools are designed to operate in light drill presses, portable drills or breast drills and also are available with square shanks for use in hand braces.

•

Welding Goggle

A new, improved AO Duraweld welding goggle said to provide eye protection and comfort is offered by American Optical Co., Southbridge, Mass. Newly designed eyecups, automatically molded for the right and left eye, have large, comfortable edges, rounded to fit flush against the contour of the face. The eyecups also are shallow but with deep sides, constituting the best balance obtainable between proper height for wide vision and adequate protection. Improved nasal fitting also adds to comfort and safety.

Side shields of entirely new design provide excellent ventilation to keep eyes cool and to help prevent fogging of lenses. The new style louvers are so designed, it is stated, that it is impossible for stray light rays or sparks to reach the eyes. Easily adjusted, the non-slip one-piece headband resists perspiration, oil, water, grease. The ball-chain bridge, covered with curved plastic tubing which fits snugly over the bridge of the nose, can be quickly and easily adjusted.

As standard equipment the new goggles are fitted with Noviweld lenses in 3, 4, 5, 6 or 8 shade. Optional equipment includes Filterweld lenses in 3, 4, 5, 6, 7 or 8 shade; Noviweld-Didymium lenses, for absorbing yellow sodium flare, in shade 3, 4, 5 or 6; or Super Armorplate Calobar lenses of medium, dark or extra dark shade for persons working near welding operations.

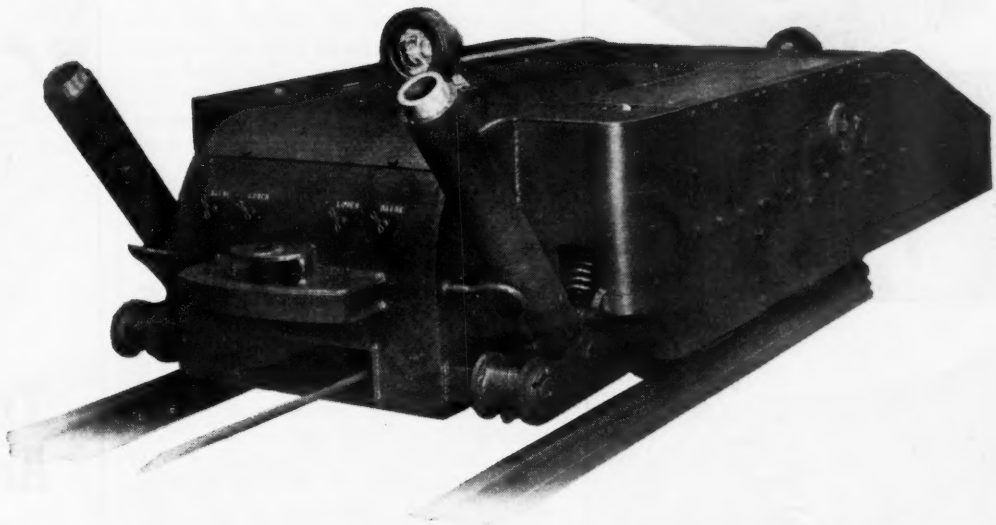
•

Fire Extinguisher

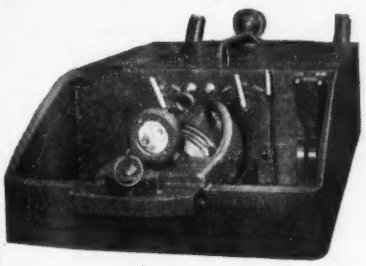
A lightweight vaporizing liquid-type fire extinguisher is offered by the General Detroit Corp., 2270 East Jefferson Ave., Detroit 7, Mich. Called S O S Fire Guard, this unit is standard equipment on the Army's newly announced troop and supply carrier, the "Weasel." Because of its

ONE PENNSYLVANIA COAL MINE REPORTS

A SAVING OF $70.00 A DAY
ABOVE THE COST OF LABOR REQUIRED TO RUN THIS MACHINE



THE NEW BROWN-FAYRO POST PULLER



MOTOR END VIEW OF POST PULLER

During the entire period for which accurate records were kept, the value of recovered posts, crossbars, rails and planks exceeded by 70 dollars a day the labor cost of operating the machine.

Another benefit, important but difficult to evaluate, is better roof control that reduces crushing of coal and overweighing of live workings.

The new "Brownie" Post Puller has such necessary features as two rope speeds, friction clutches and hydraulic jacks, but just as important is the fact that this machine has been carefully designed, in all of its details, for this particular application. It does its work quickly and efficiently.

It will pay you to investigate the new "Brownie" Post Puller. Write today for detailed information.

Other Brown-Fayro products: Car Spotters, Mine Cars, Portable Blowers, Rigging Hoists, Gathering Pumps, Layer Loading Hoists, Car Retarders, Room Hoists, Sheaves and Rollers, Rerailers and Derailers.

THE BROWN-FAYRO COMPANY
JOHNSTOWN, PENNA

small size (1 or 1½ qt.), the Fire Guard also may be installed on trucks, cars, boats and planes. Its action is said to be particularly fast on electrical, oil and gasoline fires. Tested freedom from vibration leakage, according to the manufacturer, makes the extinguisher particularly suited for use in vehicles of all types.

•

Power Grease Gun

A new Alemite electric portable power grease gun, Model 7190, is announced by the industrial Alemite division, Stewart-Warner Corp., Chicago. It has been developed to handle fast, positive high-pressure lubrication with all types of lubricants that seek their own level. Equipped with large heavy-duty wheels for easy mobility, operation is further facilitated by means of a ball-bearing front caster in the steering mechanism.

A quiet driving device connects the heavy-duty ½-hp. electric motor to a high-pressure grease piston and cylinder made of specially treated and hardened steel and fitted to close limits to prevent bypassing. A mercury switch automatically shuts off the motor when 5,000 lb. of pressure has been built up in the delivery hose.

The gun has an easily accessible check valve and pressure release valve. Equipment includes a 12-ft. electric cord, a 6-ft. ¼-in. 20,000-lb.-burst pressure hose and control valve with hydraulic coupling, combination handle, cord and hose rack. The gun is 28½ in. high, 15 in. wide and 26 in. long.

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Industrial Notes

EDGAR C. BRANDT has been appointed as assistant to A. J. M. Baker, general manager of the Crocker-Wheeler Electric Mfg. Co. division of Joshua Hendy Iron Works, Ampere, N. J. Mr. Brandt formerly was associated with the Elliott Co. as vice president and general manager and with the Westinghouse Electric & Mfg. Co.

WICKWIRE SPENCER STEEL CO. announces these changes in operating personnel: W. G. Werme, formerly superintendent at the Clinton (Mass.) plant, has been appointed chief development engineer of the company. Gordon Lloyd has been appointed superintendent at the Clinton plant. Victor Chartner has been appointed chief mechanical engineer of the company.

FLOOD CITY BRASS & ELECTRIC CO., Johnstown, Pa., has chosen C. N. Replogle Jr. as president. Recently released from the Army, he succeeds his father, C. N. Replogle, who died in March.

AMERICAN CAR & FOUNDRY CO. has appointed E. J. Finkbeiner a vice president after 40 years' association with the company. He will continue in the operating department. Olin H. Phillips has been placed in charge of laboratory research work of all the company's plants, succeeding John W. Steinmeyer, who has been transferred to the New York research department. Charles J. Hardy Jr., formerly of the law firm of Hardy, Stancliffe and Hardy, and until lately on active duty

JOY *use*

THE RIGHT BEARINGS FOR LOADERS

The places where SKF's are located on this 20,500 lb. 11-BU Coal Loader are no sinecures for bearings. This heavy-duty machine loads up to four tons of coal per minute from seams averaging 60 inches or more in thickness. Yet SKF's assure easy starting and cool, smooth running of the motor, pedestal and forward and reverse clutch shafts. The high load carrying capacity, self-alignment, freedom from adjustments, and many other advantages of SKF Bearings make them Joy's choice for all their products. 5656

SKF INDUSTRIES, INC., PHILADELPHIA 34, PA.

SKF - EQUIPPED

Loader

Built by
JOY MANUFACTURING CO.

with the U. S. Navy, has been elected a vice president and director. Among his duties will be the handling of public relations for the company.

Worthington Pump & Machinery Corp., Harrison, N. J., announces that C. W. Camp, formerly with Crocker-Wheeler Electric Mfg. Co. for 38 years, is now associated with Worthington as consulting electrical engineer. He replaces the late Harry Wood.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has appointed Hugo W. Liebert as general works manager of the tractor plants; Fred S. Mackey as general works manager, general machinery plants, and Harry E. Ladwig as works manager, West Allis foundries and pattern shops. Frank C. Angle, manager of sales activities in the Pacific region, has been appointed manager of all field sales offices of the general machinery division. W. A. Meyer has been made manager of dealer sales, vice S. H. Gorham, resigned.

Appalachian Constructors, Inc., 403 High St., Morgantown, W. Va., has taken over the business of J. E. Falter, contractor.

E. I. duPont de Nemours & Co., Wilmington, Del., has appointed T. R. Carlson as director of production, explosives division. He will succeed F. R. Wilson, recently promoted to be manager of the explosives division. He joined the company in 1928.

Fairbanks, Morse & Co., Chicago, has purchased the Pomona Pump Co., a division of Joshua Hendy Iron Works, in a $4,000,000 transaction. All physical assets, patents and trademarks were included in the transaction. The Pomona firm has plants in Pomona, Calif., and St. Louis. Arnold G. Brown, general sales manager of the Pomona company, becomes assistant manager of Fairbanks-Morse Pump Division in charge of Pomona and Westco products. Hereafter the Pomona pumps will be known as Fairbanks-Morse-Pomona and Fairbanks-Morse-Westco line.

William A. Anderson, 74, president, John A. Roebling's Sons Co., Trenton, N. J., wire and cable manufacturers, died Sept. 10 at his home in Princeton, N. J. His election in 1936 as president of the company, which he joined in 1888, marked the first time that anyone not a member of the Roebling family headed the company.

Wilbur C. Osha, until recently general welding superintendent of A.C.F. Berwick (Pa.) plant, has been appointed general supervisor of welding for the American Car & Foundry Co.

Portable Lamp & Equipment Co., Pittsburgh, Pa., has appointed C. Leslie Jamison as vice president in charge of sales for the Strauss Co. division, with headquarters in the former offices of the Strauss Co., 925 Liberty Ave. The Strauss Co. division manufactures a complete line of safety hats and caps, safety belts and harness, and other types of accident-prevention equipment.

Lincoln Electric Co., Cleveland,

KEEPING 'EM BUSY

There are two things about this picture to warm the hearts of miningmen. One is the sight of an important mine in full war production. The other is the sight of husky Mack trucks doing their part to keep every shovel working "all out." Each of these Macks, with their 30-ton load capacity, can move 2,160 tons of earth every 24 hours! No wonder mine operators depend so much on Mack. They know its bed-rock toughness, its down-to-earth operating economy—and its 44-year-old reputation for being *more* truck, ready and able to take more punishment, and do more work. They know from experience what "Built like a Mack" means . . . and what a satisfaction it is to have Macks on the job.

Mack Trucks, Inc., Empire State Building, New York, N. Y.
Factories at Allentown, Pa.; Plainfield, N. J.

Mack

TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY . . . IF YOU PLAN TO GET ONE, YOU'RE WISE!

Ohio, has transferred W. R. Persons, Pittsburgh district manager, to the factory and main office, at Cleveland, to carry out a special post-war planning assignment. J. S. Roscoe, former Syracuse district manager, has been appointed manager at Pittsburgh.

PHILCO CORP. has appointed Walter A. Furst as district representative in the Pittsburgh area for the storage battery division.

L. B. FOSTER CO., Pittsburgh, Pa., has opened a Pacific Coast office in the Russ Building, San Francisco 4, Calif., under the management of William H. Scanlon.

ENTERPRISE WHEEL & CAR CORP., Bristol, Va.-Tenn., announces that Herman H. Pancake, formerly with the American Car & Foundry Co., is now associated with it in the engineering department at the Bristol plant.

NATIONAL BATTERY CO., with WPB approval, will construct and equip a new one-story brick testing laboratory 110x90 ft. for its Gould commercial division plant at Depew, N. Y.

MACK TRUCKS, INC., has appointed William M. Kauffmann as assistant to the chief engineer, in charge of diesel engine development.

CATERPILLAR TRACTOR CO., Peoria, Ill., has advanced W. K. Cox to the position of assistant general sales manager. William S. Ziegler, made assistant sales manager of the eastern sales division early in 1944, is now appointed sales manager of that division. F. D. Haberkorn, the company's representative in Texas and Oklahoma, has been appointed assistant sales manager of the eastern division.

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Trade Literature

STEELS—Timken Roller Bearing Co., Canton 6, Ohio. Book entitled "Evaluating the Forgeability of Steels" contains recommended forging temperatures of 68 steels as determined by the hot-twist test conducted in Timken laboratories under the supervision of C. L. Clark, Timken research metallurgical engineer. The apparatus and procedures used are described and the results of tests on various steels interpreted.

REDUCTION UNITS—Cleveland Worm & Gear Co., Cleveland, Ohio. Bulletin embodies a concise description of the new Speedaire fan-cooled worm gear reduction units. It is declared that because of the more effective removal of heat the Speedaire unit delivers up to twice the horsepower capacity obtainable from standard-type worm reducers of equal size when operated at the usual motor speeds.

HIGHWAY MAINTENANCE—Athey Truss Wheel Co., 5631 West 65th St., Chicago 38, Ill. Folder entitled "To Help You Maintain Better Highways" illustrates time- and labor-saving methods of removing and salvaging surplus materials on highway maintenance and construction through the use of the new self-propelled Athey force feed loader.

DRESSERS FOR BLAST-HOLE DRILL BITS—Bucyrus-Erie Co., South Milwaukee, Wis. Bulletin BD2, describing No. 8 and No. 12 blast-hole drill-bit dressers, tells how the driller can get faster dressing for his bits with less waste of steel and with fewer sharpenings by using No. 8 for bits up to 6⅞ in. in diameter and No. 12 for bits up to 12 in. diameter. This bulletin also includes illustrations and descriptions of three other pieces of equipment useful to the driller: bit furnaces, quenching tanks and bit-handling cranes.

FLAT SPRAY NOZZLES—Chain Belt Co., Milwaukee, Wis. Bulletin 459 describes Rex flat spray nozzles, in service in practically all industries where water is used in cleaning, cooling and washing operations. They are made in a variety of sizes and from a variety of materials. Besides illustrating and describing the nozzle uses the folder gives tabular information concerning their discharge in gallons per minute, their dimensions, a list of materials, sizes and prices.

CENTRIFUGAL DRYERS—Centrifugal & Mechanical Industries, Inc., Second and President Sts., St. Louis 18, Mo. Bulletin 4-D describes C-M-I continuous centrifugal dryers, covering general facts, operating principles, design and construction; sizes, floor space and power; and capacities.

EMPLOYEE RELATIONS—Robbins Co., Attleboro, Mass. Booklet entitled "Executive Study" reports managements' experience with the use of tested employee relations techniques.

PROTECTIVE COATINGS—Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y. Bulletin AAA No. 377 describes Triple A industrial paints for the prevention of rust and corrosion in iron, steel, wood, brick, concrete and other surfaces.

VIBRATING SCREENS — Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Bulletin B6330 describes low-head horizontal vibrating screens for wet or dry cleaning that now incorporate a new "end-tension deck" principle of tensioning screen surfaces longitudinally, insuring an even bed depth of material.

TRANSFORMERS — Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Bulletin B6333 describes an expanded line of distribution transformers designed to withstand complete submersion in water. Shaped rectangularly, the tanks are fabricated from heavy-gage rust-resistant copper-bearing steel plates. All joints are electrically welded to insure absolute oil- and water-tightness. Tanks are designed with recessed bottoms to protect against rough handling and corrosion. For medium and larger sizes of subway transformers, the tanks are provided with radiating steel tubes for cooling.


PROX
FOUNDED
1875
"COAL TEETH" —the Prox alloy tool steel precision hardened double point bits —put more bite in any mining machine.
Direct bit cost per ton is a minor factor among others that overshadow its importance in appraising the real value of any particular type of coal cutting bit.
24 HOUR BIT SHIPMENTS
FRANK PROX COMPANY, INC.
TERRE HAUTE, INDIANA - 1205 S. FIRST STREET

How to stretch the life of those precious cables

• There's a bigger-than-ever production quota to be met this year, and electric cables are going to play a mighty important part in the result. Don't wait until those vital cables are beyond repair — you know how hard they are to replace. Keep them in the fight with tough, double-grip Ruberoid Insulating Tape.

Ruberoid Insulating Tape does more than a patch-up job, it practically renews cable! Nothing like it for safe, fast, tight splicing and insulating. Another thing, it *lasts,* because it's built to withstand the roughest treatment. Your mine supply house carries it—make sure you have it on hand by getting in an order today.

Only RUBEROID INSULATING TAPE has all these 7 features

1 Double grip—both sides adhesive

2 Great tensile strength . . . tough

3 Won't tear, ravel or pucker

4 Resists abrasion

5 Acid- and alkali-proof

6 Extra thick . . . one layer insulates

7 Exceeds A.S.T.M. specifications by 300% in adhesiveness, 26% in tensile strength, 290% in dielectric strength

OTHER RUBEROID PRODUCTS FOR COLLIERIES

ROLL ROOFING & SHINGLES
INSULATING PAINTS
BUILT-UP ROOFS
ASBESTOS INSULATIONS
ASBESTOS AND MAGNESIA PIPE COVERINGS
ROOF COATINGS AND PLASTIC
CORRUGATED ASBESTOS-CEMENT ROOFING AND SIDING
STONEWALL BOARD

RUBEROID

INSULATING TAPE

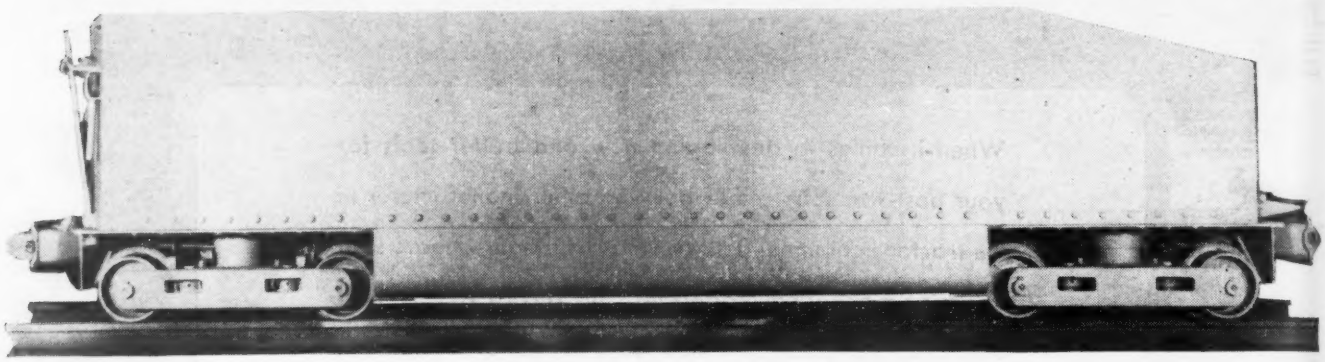
The RUBEROID Co., *Executive Offices,* 500 Fifth Ave., New York 18, N.Y

Big, modern cars alone, as pointed out elsewhere in this issue, can save 10c. a ton or more in haulage cost and improvement in face operations.

From April, 1944 Coal Age

BIG MINE CARS

Could Save $68,000,000 on 1944 Coal Production

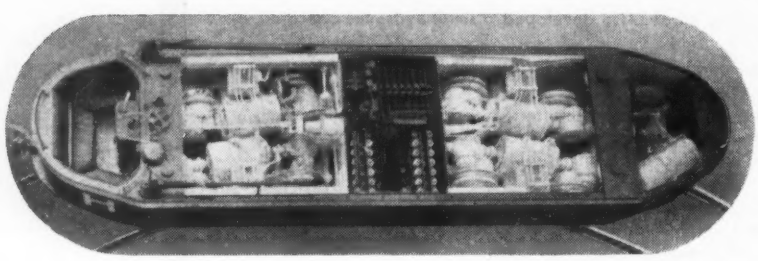


DIFFERENTIAL

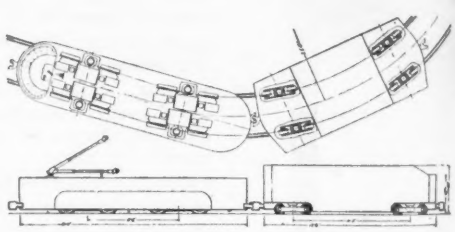
8 WHEEL AXLESS MINE CARS

● Operators are finding that savings of 10 cents a ton or more are possible by the use of large mine cars. With the industry requirements for this year reaching a total tonnage of 688,000,000 tons of coal, the saving possible by the use of large cars would amount to $68,000,000 in round numbers.

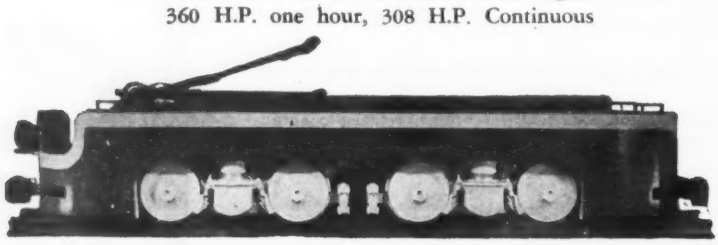
The advantages of the Differential 10 ton 8-wheel AXLESS mine cars are clearly evident. Their greater carrying capacity within a limited height — the fewer car changes required behind the loader — the increased tonnage handled at each car spotting all point to more tons per shift and a lower cost per ton.

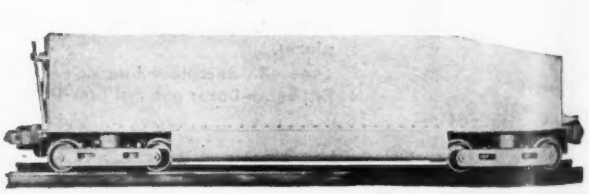


"A lot of Locomotive in a Small Package." 360 H.P. one hour, 308 H.P. Continuous



Powerful Locomotives and Fast Large Cars LOWER COSTS





DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO, U. S. A.

Builders of Haulage Equipment Since 1915

AIR DUMP CARS · MINE CARS · MINE LOCOMOTIVES · ROCK LARRIES · DUMPING DEVICES
BURDEN-BEARING LOCOMOTIVES · STOCKPILING CARS · COMPLETE HAULAGE SYSTEMS

Will I have a warm home this winter?

That's a hard question to answer, but it looks more and more likely that you *will* have enough heat, if you heat with Bituminous Coal.

But don't think of your family's dependence on coal just in terms of heat. Quite aside from that, you depend on Bituminous Coal in ways you may never have thought of! Every time you turn on the light, listen to the radio—every way in which you use electricity in the home—the chances are that Bituminous Coal produced the electric power. Coal pulls nearly all trains. It makes *all* of our steel. More than 200,000 different products depend on coal.

Yes, American civilization is *built* on Bituminous Coal! And last year the U. S. Bituminous Coal industry mined more coal than had ever been taken out of the ground in any country at any time in the history of the world.

What Can I Do? . . . You can help the attractive picture of a warm home, shown above, to come true for you. Burn your coal efficiently. And order your supply of Bituminous Coal now. In that way you help the men who mine the coal, the railroads that transport it, your local coal dealer, and your own family.

BITUMINOUS COAL *Institute*

60 East 42nd Street, New York 17, N. Y.

ENLIST YOUR SAVINGS IN WAR BONDS

AIRCO GASES

. . . FOR PRODUCTION, MAINTENANCE AND RESEARCH

AIRCO gases, produced by modern scientific methods to the strictest standards of purity and uniformity, are supplied to industry through nation-wide Airco distributing points. These gases are available in volumes to meet every requirement . . . in standard commercial size cylinders and in trailers with capacities up to 40,000 cu. ft. Thus Airco gases are quickly delivered to shops and plants throughout the country in whatever size containers are most suitable for the customers' needs. In that way, individual requirements for 200, 20,000, or several million cubic feet, monthly, are met.

To assist manufacturers in using these Airco gases most effectively, Air Reduction provides "on-the-job" technical assistance through its Applied Engineering Field Service Department. For further information on Airco gases—as well as Airco's complete line of apparatus and supplies for every oxyacetylene flame application and arc welding need—call or write the nearest Airco office, or, if you prefer, communicate direct with the New York Office, Department CA.

OXYGEN guaranteed 99.5% pure . . . assures maximum speed and economy in cutting, and greater efficiency in welding.

ACETYLENE proved by use and test to be the most economical fuel gas for oxyacetylene welding and other flame applications.

NITROGEN dry and inert, contains less than 0.3% oxygen. Also available at higher purity to meet specialized needs.

HYDROGEN produced electrolytically, contains less than 0.5% oxygen.

ARGON manufactured pure or mixed with nitrogen as specified by user.

HELIUM is available with a purity of approximately 98% and higher.

★ BUY UNITED STATES WAR BONDS ★

AIRCO

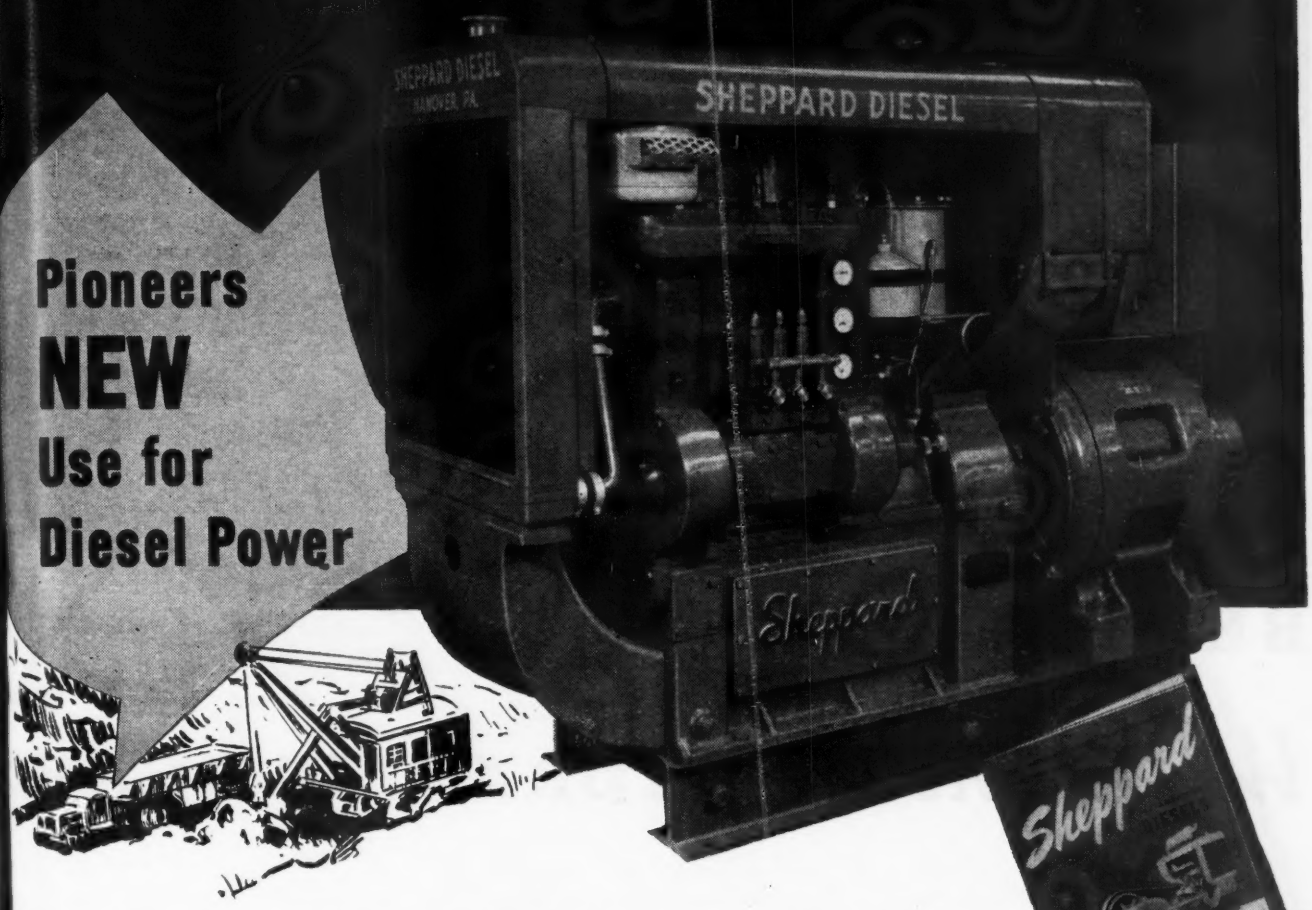
AIR REDUCTION

General Offices: 60 EAST 42nd STREET, NEW YORK 17, N. Y.

In Texas: MAGNOLIA AIRCO GAS PRODUCTS CO. • General Offices: HOUSTON 1, TEXAS

Offices in all Principal Cities

NEW *Sheppard* Installation in Strip Mine



Pioneers NEW Use for Diesel Power

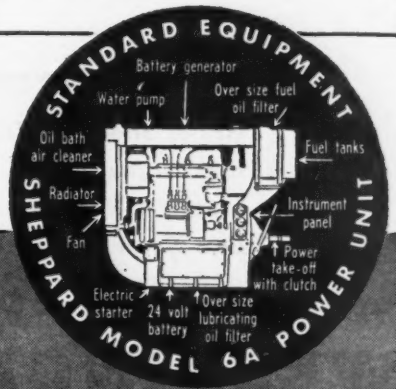
THE Dye Coal Company of Cadiz, Ohio, has just installed a Model 6A Sheppard Diesel as the prime generator of power for maintenance equipment. This is a new use for a Diesel . . . and it points the way to improved operation and substantial power economies in similar installations.

The Sheppard Diesel used by the Dye Coal Company is a Model 6A direct-connected . . . by means of a double engagement flexible coupling . . . to an 18.7 KVA—AC 120/240 volt, 1200 R.P.M. generator. This unit is mounted on a steel beam base and is equipped with an automatic starting control.

The Dye Coal Company will use this Sheppard Diesel to generate light and provide power for operating drill presses, grinders and other small tools in the field repair shop; for repair and maintenance of power shovels, bulldozers, trucks and other equipment for stripping operations. On priority, Sheppard Diesels are available NOW to essential industries. Sheppard Diesels for post-war use in all industries may be "reserved" through the Sheppard Post-Priority Plan. Before buying any Diesel or a substitute power source, check on the availability of Sheppards.

Free Bulletin—JUST PUBLISHED—
Shows Sheppard Pump Applications

Sheppard Diesels are standard equipment on the pumps of many nationally known manufacturers. Sheppard also supplies complete pump units. Learn how Sheppard performance is cutting pumping costs . . . increasing pump output . . . in diversified industries. Write today for free Sheppard pump bulletin . . . just published.



R. H. SHEPPARD COMPANY, HANOVER, PA.

Sheppard
ALL AMERICAN DIESELS

When You Rebuild Locomotives

Make a BETTER JOB *with* . . .

Westinghouse HYDRAULIC BRAKE

The rebuilt locomotive is then able to handle heavier loads, at higher speeds, with greater safety. Graduated control permits accurate, time-saving spotting. Flexible fluid power, under finger-tip guidance, replaces slow, cumbersome hand braking. Operator fatigue is eliminated. More output is attained at less cost in man hours, equipment and maintenance.

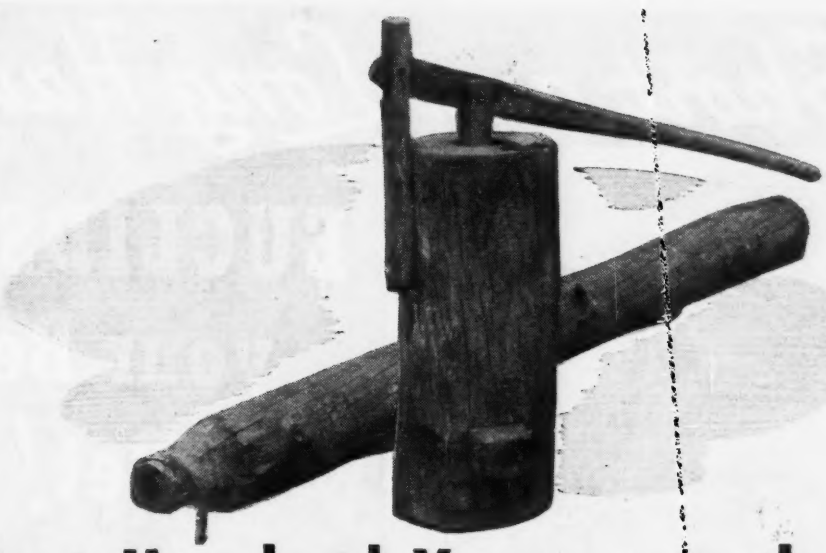
No need for motor bucking and dragging brake shoes—the hydraulic brake does all the braking. Relieved of shocks the locomotive stays on the job longer. Motor repair costs are greatly reduced. No rebuilding of the existing brake system is required—the hand brake and levers are retained and the hydraulic brake devices readily added.

TYPICAL RESULTS REPORTED BY ONE USER

Brake Shoe Life Increased from One Week to Three Months ★ Wheel Turning Decreased 50% ★ Motor Bucking to Check Speed or Stop, Entirely Eliminated ★ Shocks to Mechanical and Electrical Apparatus Greatly Reduced ★ Less Sand Required—Better Rail Contact Cuts Power Loss and Overheating.

WESTINGHOUSE AIR BRAKE CO

INDUSTRIAL DIVISION - WILMERDING, PA.

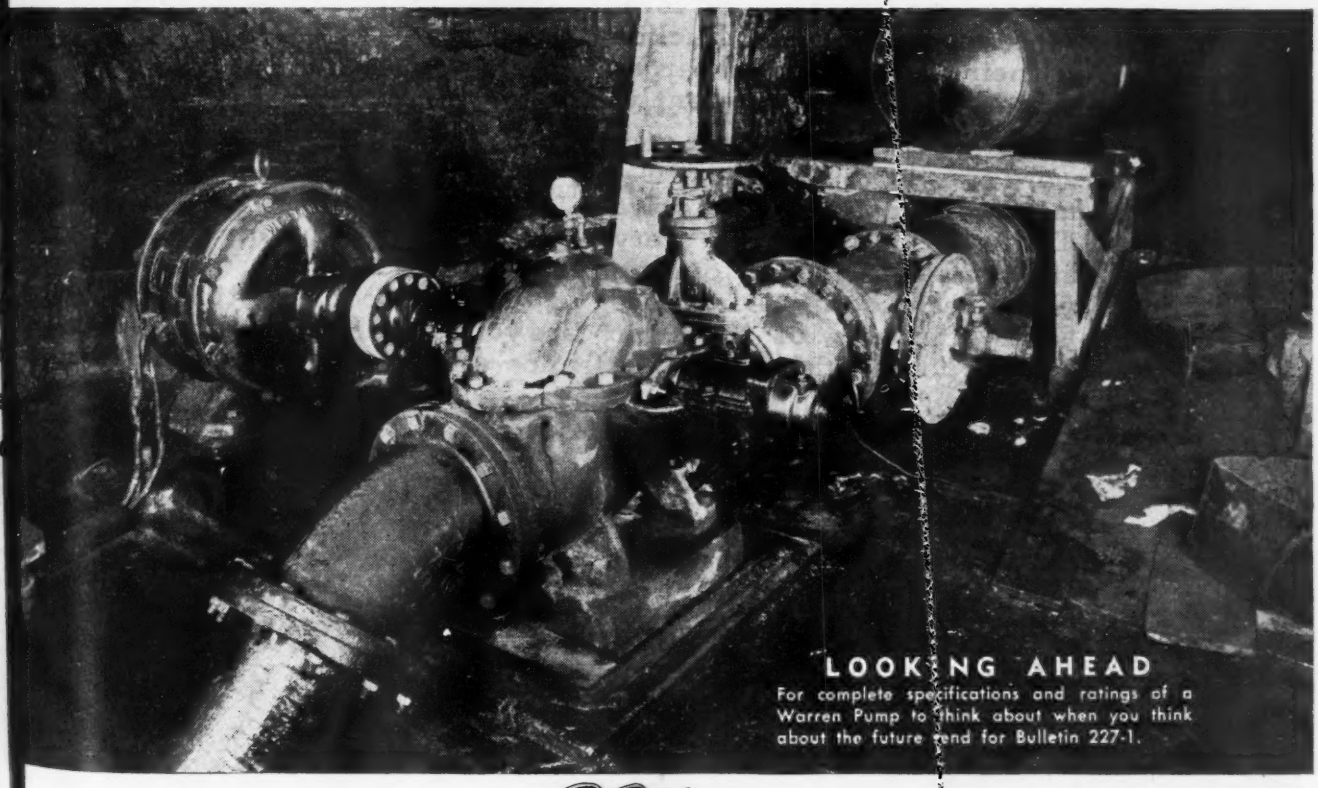


The First Hundred Years are the Hardest

Apparently even in the old days producers had their conversion problems. When bituminous mining in the Gallitzin area of central Pennsylvania had developed — about a century ago — to a point where natural drainage was no longer adequate, this hand-made, hand-operated wooden pump and 300 feet of wooden piping were installed. This was soon replaced by a metal pump of English manufacture, which in turn had to be discarded when a lower seam was tapped.

Power pumps took over — one of 60 horse power and one of 100 horse power — but in wet seasons, although operating around the clock, they still could not handle the water.

Finally Warren engineers were called in. They recommended the installation of this all-bronze chrome-fitted Warren Pump with 12" suction and 10" discharge openings. It has a capacity of 3500 gallons per minute, and in dry seasons requires operation for only seven to ten hours a week. It saves many dollars in pumping costs each month — and the mine operation crews now get their regular sleep.



LOOKING AHEAD

For complete specifications and ratings of a Warren Pump to think about when you think about the future send for Bulletin 227-1.

ARMY E NAVY

WARREN STEAM PUMP COMPANY, INC.

WARREN, MASSACHUSETTS

For Short and Long Hauls..

EUCLIDS are your Best Bet!

Countless millions of tons of ore, rock and heavy excavation have been hauled with unusual speed and economy by Rear-Dump EUCLIDS. On shuttle operations or long hauls . . . on level stretches or steep grades . . . Euclids have proved their ability to haul larger pay loads faster and more efficiently.

With a speed range from 2 to 24 m.p.h. —eight forward speeds, four backward— and full floating double reduction drive axle, Rear-Dump EUCLIDS meet every requirement of power and speed for long or short hauls. Special controls increase usefulness and efficiency of the unit . . . full unobstructed vision of the operator makes travel in either direction easy and safe.

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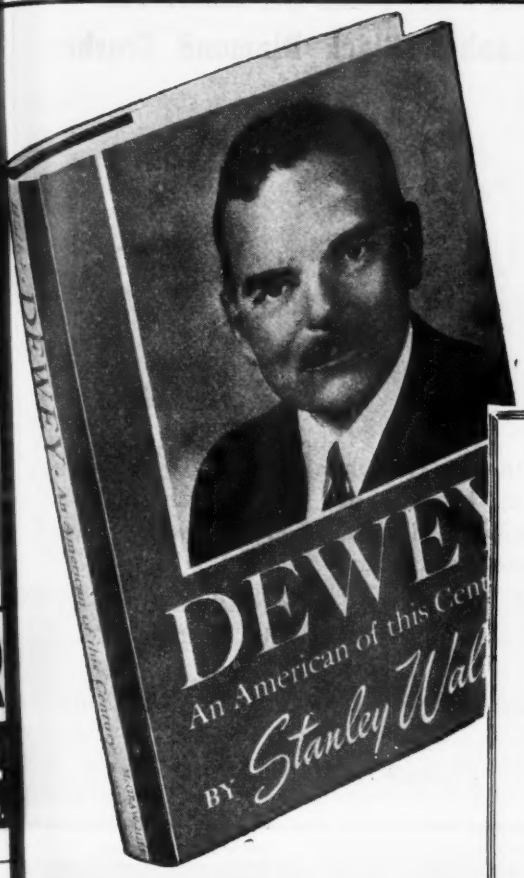

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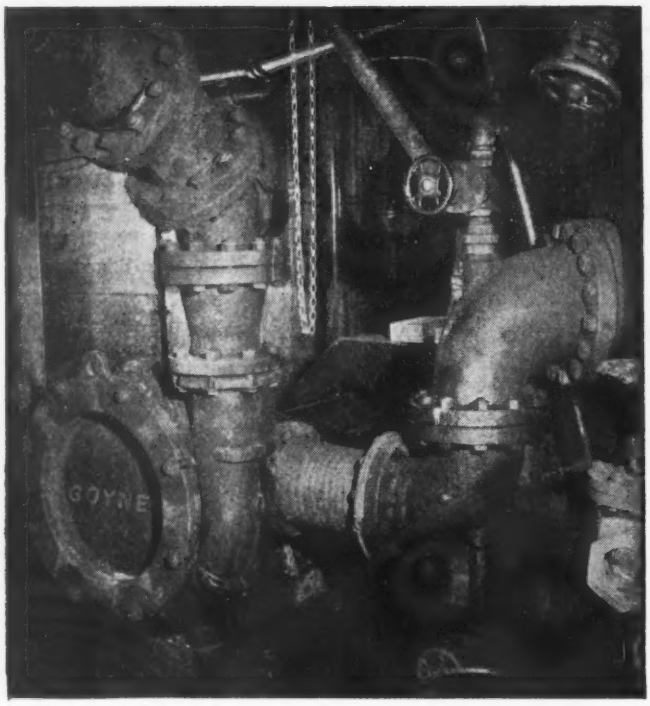

A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne:

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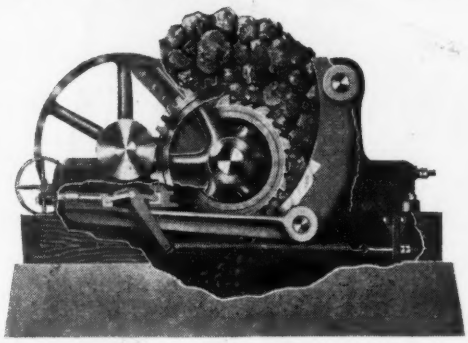

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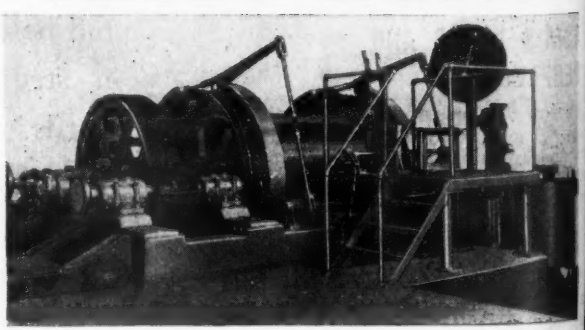

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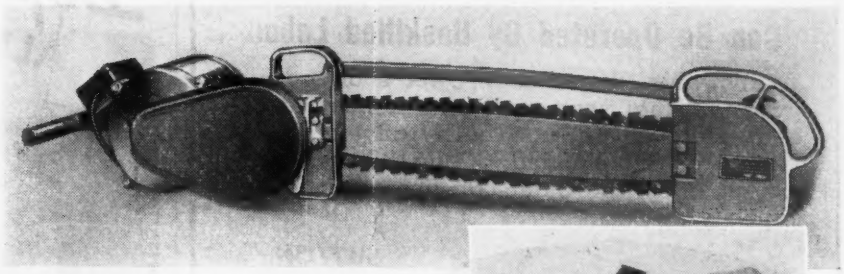

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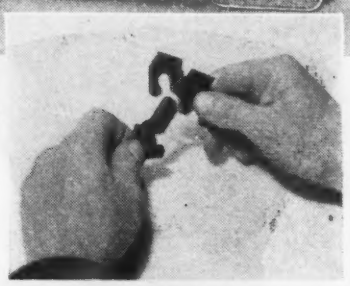

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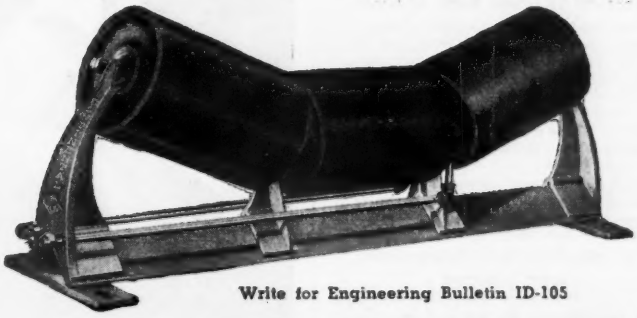

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SEARCHLIGHT SECTION

(Continued on opposite page)

POSITIONS VACANT

WANTED:—DRAGLINE operators, for Page, Monighan, and Cat draglines. Stripping coal. Must have coal stripping experience. Give full history of experience, giving names of firms employed by, length of time employed, and class of machines worked on. Morgan Coal Company, 19 West 38th Street, Indianapolis 8, Indiana.

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SUPERINTENDENT, twenty years practical mining experience, technically trained, qualified to handle all phases of coal mine operations. Physically fit, age 47, head of family. Will not consider war time position. PW-267, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

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WANTED: A few going coal mines with good roof and large undeveloped acreage. Must have clean coal and some equipment and camp for employees. Give full details in first letter. Avory Scott Coal Co., Box 3, Kimball, W. Va.

(Continued on opposite page)

WANTED

WANTED—COAL Age magazines of the last 5 years preferably yearly volumes. Box 871 Equity, 113 W. 42nd St., New York 17, N. Y.

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Must be in good condition and priced right. Would consider other makes.

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P & H 650 Shovel and Crane
Buc. Erie GA-2 Shovel, gas
General ½ yd. Diesel Crane
P & H 250 Truck Crane, 16½ tons
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Lorain 45 Crane-Shovel, ¾ yd.
Lorain 75-B, 1½ yd. Shovel-Crane
Northwest Model 3 Shovel-Backhoe
Conway Mucker "75", 36" gauge
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Koehring 301, ¾ yd. Shovel & Crane
Buc. Erie Steam Dragline, 6-8 yds. 175' bm.
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Gyratory Crusher, Superior-McCully 30"
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I. R. 1302 CFM., 2 stage Air Compressor
Bucket elevator, belt, 22", buckets, 35'
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42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

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Width	Ply	Width	Ply	Width	Ply
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16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

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	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
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WAYNE, WOOD COUNTY, OHIO Near Toledo

PIPE New & Reconditioned
ALL SIZES for ALL PURPOSES
Cut and Threaded to Your Specifications
VALVES AND FITTINGS
UNITED PIPE & SUPPLY CO., NORRISTOWN, PA.

LOCOMOTIVES

Goodman: All 250 volts.
1—10 ton, 31-1-4-T.
1— 6 ton, 30B, 42" 1—5 ton.
1— 5 ton, W-1-2, 36".
2— 5 ton, 2600 K.
1— 6 ton, 33-1-4-T.
2— 8 ton, 32-1-4-T.

Westinghouse: All 250 volt.
1—4 ton, 902, 48" 1—13 ton, 102, 42"
1—904 c, 44" 500 volt. Also 906 motors.
1—10 ton, 915.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt. 4 ton 1022, 44" as is
6 ton 803, 44", as is 5 ton 825, 44"
6 ton 823, 44" 8 ton 839 motors
6 ton 801
8 ton 839
Battery Locomotives GE., Ironton and Atlas:

Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt
1—Jeffrey MH 100, frame only.

MINING MACHINES

Jeffrey, 35B and 4—28A, 250 V. 4—29B, 29C, 29CE with shearing head.

Goodman, 12A, 12AB, 12AA, 12G3A, 34B
1—12G3 250 volt and 2—112 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA,
2—124EJ.

Sullivan, CE7, CE9, CE10, CR10 Low Vein. CR5 for middle cutting.

SUBSTATIONS—275 volts, D. C.

2—200 KW **G.E.** Rotaries (600 volt)
2—150 KW **West.** Rotary.
1—200 KW 1—100 KW **Ridgway** M-G Sets
1—100 KW **West.** M-G Sets.
2—100 KW **G.E.** Rotary.
1—100 KW **Allis-Chalmers** Rotary.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, 29B, 35B and 28A. **Goodman** 34B, 30B, 30C, 12A, 12AB, 12AA 33-1-4-T, 31-1-4-T. **General Electric** 801, 803, 819, 821, 825, 839. **Westinghouse** 904, 906, 102, 907, YR2, 115. Also 200 KW **Westinghouse Rotary Converter Armature,** 250 V. Bracket Type, 150 KW G.E. HCC Bracket Type, and 150 KW G. E. TC Pedestal Type.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE * COMPRESSORS * DUMPS * SPEED REDUCERS FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVELS * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Gooseneck), 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS * COAL CRUSHERS (double roll) 12"x16", single roll 24"x36", 24"x24" * ROPE & BUTTON CONVEYOR 400' long LATHES, SHAPERS * SWITCHES * AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps * MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps * HOISTS, overhead, AC. 3-60-440. 1 ton and 2 ton * 1 clam shell bucket 1¾ cubic yard. 1—Figure 8 drum * MINE CARS * 2 SULLIVAN BIT SHARPENERS * R.R. SWITCHES 85# to 100# HOISTS 5 HP AC and DC GENERATORS DC 250-275 volt, 30 KW to 100 KW. Also 50 KW 125 volt direct connected to steam engine. Goodman Scraper Loader.

GUYAN MACHINERY COMPANY, Logan, W. Va.

USED EQUIPMENT FOR DELIVERY NOW

SPECIAL

70—300 Amp. Motor Driven Welders

25—Westinghouse Portable

45—Hobart Stationary

Available for immediate delivery

All used on one construction job—one year old

Each complete with 125 feet of welding cable, hood, and electrode holder

MOTORS

1000—230 volt DC and 220, 440 and 2300 volt, 3 ph. 60 cyc.—From 1—500 HP.

BOILERS

4—150 HP HRT 150#
2—684 HP Waste Heat 200#
4—1010 HP Water Tube 250#
2—450 HP new Westinghouse Stokers

MISCELLANEOUS

4—3' x 5' Hummer Screens, double deck
1—20 Ton G.E. Locomotive Std. Gauge Elec.
Belt Conveyor—all sizes
Screw Conveyor—8" to 16"
Steel Storage Bins—from 230 cu. ft. to 35,000 cu. ft.
200 HP Motor Driven Mine Hoist, single drum

All of this equipment is owned by us and may be inspected at Phillipsburg, N. J.

HEAT and POWER Co.

45 BOND ST. NEW YORK 12, N. Y.
PHONE: ALgonquin 4-3874

HOISTS

1—Ottumwa double drum, single gear reduction Electric Shaft Hoist, complete, in first-class condition, with 60 horsepower, 600 revolution, 220 volt, 3 phase, 60 cycle, General Electric motor.

LESLIE E. BRYANT
Clarksville, Arkansas

MINING EQUIPMENT READY FOR DELIVERY

CUTTING MACHINES

2—35-HP. 12-AB Goodman, 250 volt
1—50-HP. 12-AA Goodman, 250 volt
2—28-A Jeffrey 250 and 500 volt
1—CR-8 Sullivan, 250 volt
2—35-A Jeffrey, 250 volt
1—29-B Jeffrey Arcwall, 250 volt
1—29-B Jeffrey with 29-C bit motor, 250 volt

LOCOMOTIVES

All 250 volt

10-Ton Jeffrey, MH-110, 44" gage
10-Ton Jeffrey, MH-78, 42 or 44" gage
8-Ton Westinghouse, 44" gage
4-Ton Jeffrey MH-96, 44 or 48" gage
4½-Ton Ironton low vein, 44" gage
4-Ton G.E. 825, 44" gage

MISCELLANEOUS

18x18" Jeffrey single roll coal crusher

25-HP. single drum hoist

50-HP single drum hoist

A.C. Motors complete for Goodman standard and low vein cutting machines

6—G.E. R-22-A Locomotive controllers

100-KW Westinghouse SK generator with switchboard

Transformers, Hoists, Tipple equipment, A.C. & D.C. motors and miscellaneous coal mining and industrial equipment.

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ALL-STATE EQUIPMENT CO.

LOGAN, W. VA.

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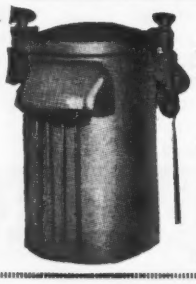

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Large quantity available from Tank Cars. 8000 and 10000-Gallon capacities Cleaned—Tested—Painted

Suitable for Storing Most Kinds of Liquids!

Whole tank cars too for mobile storage.

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39 years' experience
13484 S. Brainard Ave.
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"ANYTHING containing IRON or STEEL"

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USED MINING EQUIPMENT

1—Oldroyd Universal Cutting Machine 250 volts, D.C. Permissable, 9' Cut, 44" gauge—recently rebuilt and in good operating condition.

1—Link-Belt Vibrating Screen, Double Deck 5' x 10', 1⅛" Screen on top deck, ⅜" screen on bottom deck. Powered by 440 volt Westinghouse 7½ H.P. Motor and V-Belt Drive.

50—2 ton mine cars 42" gauge 43" above rail. Rotary or end dump.

Greensburg-Connellsville Coal & Coke Co.
Union Trust Building Pittsburgh, Pa.

Slip Ring Motors

Qu.	H.P.	Make	Type	Volts	RPM
1	20	A-C		440	1150
1	30/15	G.E.	OMT	440	1150/550
3	35/15	G.E.	OMT	440	1150/550
3	50	G.E.	OMT	440	1150
1	50	Ideal	AV	2200	575

Squirrel Cage Induction Motors

Qu.	H.P.	Make	Type	Volts	RPM
1	15	West.	CS	440	1155
1	20	A-C		220	860
2	25	A-C	AN	440	1150
1	40	A-C		2200	860

Other Items In Stock

1—½ to 30 HP, D.C. Motors
1—I/R Portable Type Air Compressor
150—5 Ampere, 110 Volt, 2 Wire Meters
1—200 K.W. 600 Volt, G.E. Converter
3—165 KVA, G.E. Rotary Transformers
8—Disconnecting Switches

District Representatives For I-T-E Automatic Reclosing Circuit Breakers.

R. H. Benney Equipment Company
Norwood 12, Ohio

MOTOR GENERATORS

1—250 KW Westinghouse Synchronous Generator, 600 Volt DC, direct connected to: 365 HP Westinghouse Motor, 3/60/2200, 1200 RPM.

1—165 KW General Electric Generator, 600 Volt DC, direct connected to: 300 HP General Electric Motor, 3/60/440, 720 RPM.

Write for stock list #441

Morse Bros. Machinery Company
P. O. Box 1708 Denver 1, Colorado

PROMPT SHIPMENT FROM OUR WAREHOUSE

MINING MACHINES

5—12 DA 50 HP 250 v. Goodman Shortwall
36 B Jeffrey 250 v. Low Vein #14318
35 B Jeffrey 250 v. 6' cutter
2—29 C Jeffrey 250 v. Top Cutters
112 Da Goodman 250 v. 50 HP Universal
3—Low Vein Sullivan CR-2 (250 v.)

STORAGE BATTERY LOCOMOTIVES

2—6 Ton G.E. Permissible Locomotives 36/44" Ga. O.S. armorplate frame. Inside steel tired wheels. 2-HM 825 Ball Bearing Motors. Type LSBE Class 2C6 From C9. 13½' long, 50" high, 69" wide and 44" Wheel base.

Each of the above units equipped with Edison Battery 80 cell A-10—one new in 1940, the other in 1939.

2—5 to 5½ Ton Type D Ironton, 36 or 42" Ga. Low Type, with Exide Battery.
1—4 Ton Jeffrey 42 or 44" Ga. with 2 MH 108 Ball Bearing Motors, Battery Box on top of locomotive.
1—5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors, Battery box on top of locomotive.
4 Ton 36" Ga. Atlas, with Exide Battery.
4 Ton 36" G.E. (2 motors), with Exide Battery.

(Haulage)

13 Ton Westgh. 250 V. 36" or 40" Ga.
10 Ton Jeffrey 500 v. 36/42" Ga.
6 Ton Westgh. 500 v. 42" Ga.
1—5 Ton West. 250 V. 36 or 42" Ga. with Electric Gathering Reels. Bar steel frame.
6 Ton Baldwin West. 250 v. 36/42" Ga. #48747 904 Motors outside bar steel frame, inside steel tired wheels.

SCREENS

2—4' x 5' single deck Tyler Hummer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

MG SETS 3 ph. 60 cy. (Syn.)

150 KW G.E. 250 v. —2200/3/60 900 RPM.
100 KW Chandeysson 150 v. DC—2300/3/60 AC Syn.

COAL CRUSHERS

18" x 24" Double roll New.
18" x 30" Double roll New.

ENGINE GENERATOR & TURBINE SETS

100 KW 250 V. DC Westgh.—Skinner Engine.
50 KW West. 125 V. DC—Skinner Engine.
57.5 KVA Allis Chalmers Gen. 220/3/60—Kerr Turbine

SLIP RING & SQ. CG. MOTORS (3 ph. 60 cy.)

HP	Make	Speed	Wdg.	Type
500	G.E.	450	S.R.	MT 412
200	G.E.	250	S.R.	MT 412
200	G.E.	600	S.R.	I-M
150/75	West.	580/290	S.R.	CW
150	West.	375	S.R.	CW
150(2)	West.	600	S.C.	CCL
125	Al. Ch.	435	S.R.	
100	G.E.	500	S.R.	MI-25 cy.
100	Al. Ch.	575	S.R.	
100	G.E.	1200	S.C.	
100	West.	690	S.R.	CW
75	West.	290	S.R.	CW

Other sizes down to 1 HP

SYNCHRONOUS MOTORS CAPACITOR

HP	Make	Voltage	Speed	Type
200	West.	2200	900	
150	G.E.	2200	900	ATI

Each of the above has a dir. con. exciter.

180 KVA 2200/3/60 Type OH1 3 ph. 60 cy.

DC GENERATORS

150 KW West. Type S. 250 v. 450 RPM
100 KW G.E. 250 v. 600 RPM
75 KW G.E. DLC 125 v. 700 RPM
65 KW G.E. CL 250 v. 1000 RPM
50 KW West. 250 v. 900 RPM
40 KW G.E. 250 v. 900 RPM

PUMPS

250 GPM 250# or 575' Head 2 cyl. Hor. National Transit 6" suc. 4" dis. enclosed driven by 40 HP Motor.
250 GPM 275' Head Worthington, 4" suc. 3" dis. driven by 30 HP 230 v. DC Motor.

HOISTS

800 HP Vulcan Slope Hoist with AC Motor and Control
500 HP Connellsville Sgl. drum slope Hoist complete with AC Motor and contactor control.
100 HP Vulcan Hoist drum 42" dia. 36" face, 9" flanges driven by 100 HP G.E. slip ring motor.
75 HP Lidgerwood sgl. fr. drum
50 HP Diamond 2 drums same Shaft
30 HP Clyde sgl. drum AC Motor
30 HP Double drum—Tandem
15 HP Lidgerwood sgl. dr. AC Motor

400 TRANSFORMERS

Qu.	KVA	Pri. V.	Sec. V
31	7½	"	"
28	10	"	"
2	25	2200	244/488
3	50	22000	2200
1	37½	2400	230/115

MOORHEAD-REITMEYER CO., INC.
PITTSBURGH, PENNSYLVANIA

Top Grade Relaying Rails

Immediate shipments

90 lb. ARA section type B (Carnegie section 9030), with four hole Rail Joints to match.

Other weights 16 to 130 lbs. per yard. Everything for Railroad Tracks.

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Carnegie, Pa.

60-TON LOCOMOTIVE

Storage Battery Type, built by General Electric Co. in 1930. Double truck, 4-motor type, each 75 H.P. Steeple cab. Good condition.

Complete specifications available.

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"ANYTHING containing IRON or STEEL"

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1—Sullivan Conveyor, Short Wall, Model 10-B

Both machines operate on direct current.

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- PROMPT SHIPMENTS
- FABRICATING FACILITIES
- TRACKAGE SPECIALISTS

EVERYTHING FROM ONE SOURCE

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FOR SALE

DORR THICKENERS AND CLASSIFIERS

3—Dorr Bowl Classifiers

10' dia. bowl with 2'3" x 19'8" rake.
12' dia. bowl with 2'3" x 21'4" rake.
15' dia. bowl with 2'3" x 23' rake.

3—Dorr Thickener Mechanisms

Trays and superstructures for 20' dia. x 10', 30' dia. x 12', 40' dia. x 12'.

CONSOLIDATED PRODUCTS CO., INC.
13-21 Park Row, New York City, N. Y.

ROTARY CONVERTERS

500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V., Transformers.
500 KW WEST. SYN 275 V. 6 Ph. 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V., Transformers.
300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

200 KW G.E. IND., 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM Manual Switchgear.
200 KW R.W. SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. 80% P.F. Manual Switchgear.

LOCOMOTIVES

13-T WESTGHE., 250 V., 908-C Mts., 36" Ga.
13-T GOODMAN, 250 V., 36-A Mts., 36"-42" Ga.
10-T WESTGHE., 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHE., 500 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHE., 250 V., 906-C Mts., 36"-44" Ga.
8-T WESTGHE., 500 V., 906-C Mts., 36"-44" Ga.
8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.
6-T WESTGHE., 250 V., 904-C Mts., 36"-48" Ga.
6-T GEN. ELEC., 250 V., 823-A Mts., 36"-44" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY
Incorporated
501 Grant Building Pittsburgh, Pa.

MINE EQUIPMENT

Transformers, 6600, 2200 & 440 Volt, 1 & 3 Phase
Hoist, 50 Hp Lidgerwood Double Drum, Tail Rope
Controllers, Both Locomotive and Auto Mine Hoist
350 HP 3/60/2200 V Weco 585 RPM S.R. Motor
250 HP 3/60/2200 V Weco 277 RPM S.R. Motor
200 HP 3/60/2200 V Geco 600 RPM S.R. Motor
A.C. & D.C. Motors—Large Stock
Switchboards Built to Order

John D. Crawbuck Co. Zone 22 Pittsburgh, Pa.

COAL AGE ADVERTISERS IN THIS ISSUE

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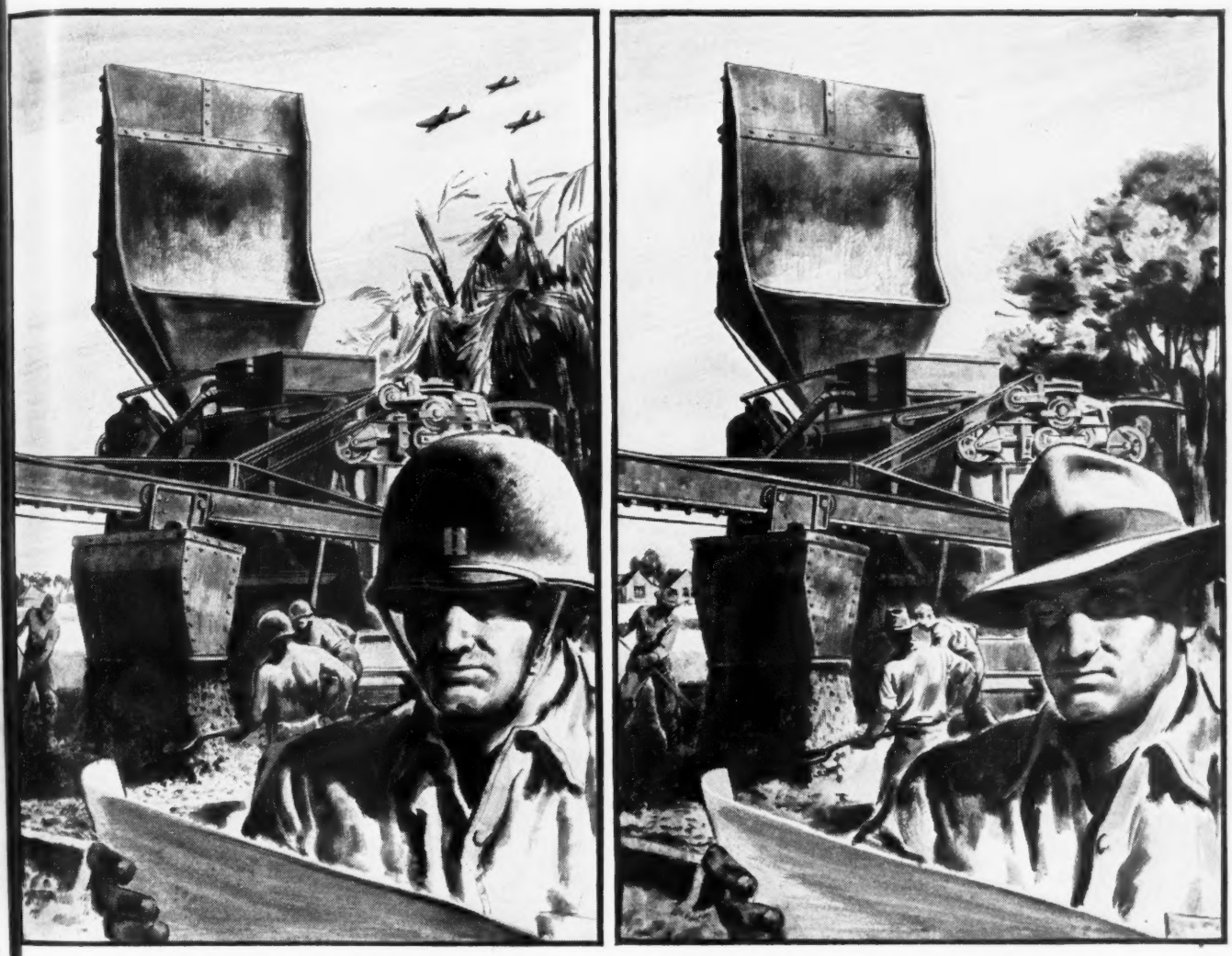

BRIDGING THE GAP to Peacetime Jobs... American Road Builders' Plan points way

Every day brings us closer to a most important wartime problem, *i.e.*, peacetime jobs for the boys who are winning the war.

The American Road Builders' Association has submitted a comprehensive plan for post-war roads and jobs. It calls for construction of needed new highways and improvement of the present United States highway system, including bridges and grade crossings. It would create jobs for millions of men. 3,000,000 jobs on highway construction alone. Millions of other jobs making and supplying machinery and materials. Jobs all over the country. Jobs that would pay good wages. Jobs that would greatly improve the America we love.

There's an inspiring 64-page booklet, "A SOUND PLAN FOR POST-WAR ROADS AND JOBS," prepared by the Association. Get a copy today. Write for it to The American Road Builders' Association, 1319 F St. N.W., Washington 4, D. C.

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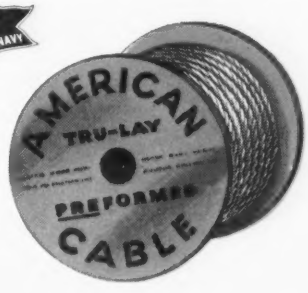

AMERICAN CHAIN & CABLE COMPANY, INC., BRIDGEPORT, CONNECTICUT

The South's Most Modern Metallurgical Coal Preparation Plant

Presents Innovations in Blending, Handling, Washing, and Cleaned Fine Coal Recovery

ALABAMA BY-PRODUCTS CORPORATION'S new Link-Belt plant shown below is now in full operation preparing coal from the Mary Lee seam. It represents an achievement in the design and integration of mechanical equipment for producing coal of high, uniform quality at greatest efficiency and lowest cost. New and original operating ideas in equipment and methods have been combined with standard Link-Belt units to accomplish—

- Greater uniformity for coking and commercial coals attained by physical blending prior to washing.
- Greater flexibility and maximum economy of operation between mining and preparation shifts is achieved through the storage of raw coal in the blending bins.
- Economical handling of mine rock, picked refuse and washery rejects to a central disposal point.
- Economy in the use of water through the closed water circuit of the washing system and clarification of the washery water.
- Low ratio of connected H.P. to Ton Hour production of clean coal.

Let us send you further information on this interesting, ultra-modern plant and the many original operating ideas incorporated in it.

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LINK-BELT COMPANY

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